Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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JUN 29 1953

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Vol. 6 No. 7 July 1953

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0 General and theoretical
1 Fish by species
2 Fresh fish
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4 Oils
5 Vitamins
6 Fishery by-products
7 Analytical Methods
8 Composition
9 Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1950

2.3 NEW SWEDISH HERRING FILLETING MACHINE

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report Number 84, Seattle, Washington (April 30, 1953)

A new herring filleting machine has just been placed on the Swedish market and is also being introduced abroad. The patent, which is of Norwegian origin, has now been taken over by a concern manufacturing washing machines and other household machine aids in Gothenburg, Sweden.

The new machine will fillet ordinary-size herring, but can be adjusted somewhat for fish of other sizes. The machine has a capacity of about ten barrels of herring per hour, corresponding to the filleting capacity of 20 to 25 persons, reports an April 14 U. S. Embassy dispatch from Gothenburg.

The machine weighs only about 550 pounds and the price is about $2,000. The price will probably be reduced as soon as the company has been able to increase production.

The machine is 44 inches high, 41 inches wide, and 54 inches long. An electric three-phase motor (220/380 volts, 2 horsepower, 1,400 revolutions per minute) furnishes the power. All movable parts are stainless material and are enclosed in a stainless steel box. When operating, the machine is fed either with fresh or salt water. The machine can be easily cleaned and it does not rust or deteriorate even if salt water is used. The whole or round fish is fed head first in the gable side of the machine. The feeding bands seize the herring and convey it towards a rotating knife which cuts

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 7 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. Reprinted in whole

2.9 THE EFFECT OF THE COMMERCIAL CANNING PROCESS UPON PUFFER POISON

Halstead, Bruce W. and Bunker, Norman C. (School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, California)
California Fish and Game 39, No. 2, 219-228 (April, 1953)

Puffers, fishes belonging to the family Tetraodontidae, have recently been introduced on the east coast as food fishes. The common names used for these fishes in various parts of the world include the following: blowfish, tambor, rabbitfish, swellfish, swellbelly, swelltoad, blower, jugfish (U. S.), toadfish, toadao (Australia), blaser (Dutch East Indies), Ikan buntal (Malaya), tambores (Cuba), botete (Phillipines and Latin America), fugu (Japan). Despite the fact that they are used for food, puffers are known to have toxic properties.

The toxicity of puffers is usually concentrated in the liver, roe and other parts of the viscera, but tests at the laboratory where the authors work indicate that the flesh, at least of certain species, may be violently toxic at times. The work of several of the investigators demonstrates that the toxicity fluctuates considerably. All of the factors that influence the toxicity are not known, but there is considerable evidence that it is related to the gonadal activity of the fish. It has been shown that the toxicity is highest during the spawning season.

The toxin is not a protein, an alkaloid nor a protamine. Tahara, a Japanese investigator, has assigned $C_{16}H_{31}NO_6$ as the provisional formula but the exact chemical structure is unknown. Puffer poisoning is accompanied by severe neurological symptoms which may result in the death of the victim by respiratory paralysis. The over-all

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 7 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Kathryn L. Osterhaug

2.1128 THE STEPHENSON COLLAPSIBLE CRAB TRAP

Butler, T. H. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 16-18 (March, 1953)

The Stephenson collapsible crab trap is constructed similarly to the ordinary rectangular type except that it has one removable center support in place of four corner supports. When the center support is in place the trap is expanded and ready for fishing. By simply pulling the pin from the center support the support can be removed and the trap collapsed for ease in transportation. Figures 1 and 2, omitted, show photographs of the gear in the expanded and collapsed positions.

Construction details and a sketch of the trap in the expanded position are shown in Figures 3 and 4, respectively. The trap shown in the sketch is equipped with a center support that has a series of holes drilled near its upper end through which a pin may be inserted. By selecting the proper hole, the height of the trap can be adjusted to compensate for shrinking or stretching of the 4-inch stretched trawl web net covering used on the trap. The cost of a complete collapsible crab trap is estimated at $4.00, or approximately the cost of the ordinary type trap.

Equal results were obtained when two collapsible traps and one ordinary trap of similar size were fished in Departure Bay near the Pacific Biological Station from December 17th, 1952 to February 5th, 1953. In like manner, the collapsible traps were able to withstand hard usage as well as the ordinary one. Corrosion resistance was obtained by painting the iron frames with a fish-oil base paint.

Intensive commercial fishing or fishing in areas having excessive wind and wave action requires a sturdy trap such as the circular type used in the Queen Charlotte Islands crab

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 7 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

1.85 THE APPEARANCE OF A NEW COMMERCIAL SHRIMP IN A NEWLY DEVELOPED SHRIMP FISHERY

Butler, T. H. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 30-31 (March, 1953)

Stuart Channel along the lower east coast of Vancouver Island became a new shrimp trawling ground during December, 1952 and January, 1953 when a total of 66,195 pounds of shrimp were caught in 183 trawling days. Most of the shrimp from the Boat Harbour ground, as the region is known to the fishermen, were landed and processed at Steveston, B. C.

Examination of the shrimp from Stuart Channel indicate that the catch is composed almost entirely of a Pandalus jordani, a species not previously taken in any quantity. Pandalus jordani, (Figure 2, this card, over) is very similar in appearance to Pandalus borealis or the "pink" shrimp (Figure 1). The differentiating characteristic is the lack of spines on the upper surface of the third and fourth abdominal segments of Pandalus jordani. A common name has not been suggested as yet for the new shrimp, which increases to six the number of species being taken commercially by fishermen.

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 7 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

HERRING FILLETING MACHINE

COLLAPSIBLE CRAB TRAP

EFFECT OF HEAT PROCESSING ON PUFFER POISION

NEW SPECIES IN B. C. SHRIMP FISHERY

2.1128 (Cross Reference: 1.86)

fishery. It appears, however, that the center support principle could be applied to the more sturdy circular trap as well as to the rectangular type of trap.

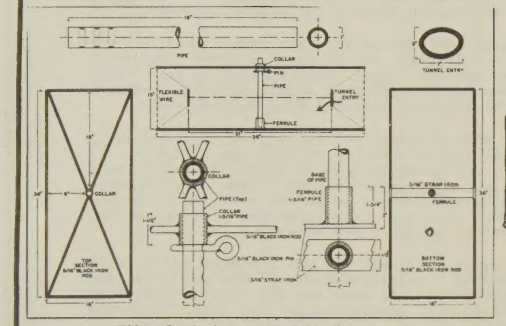

FIG. 3.—Details of construction of the collapsible trap.

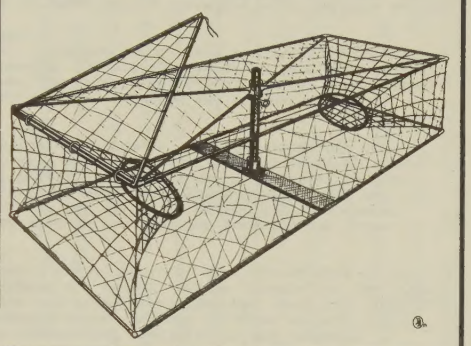

FIG. 4.—Sketch of collapsible trap in expanded position.

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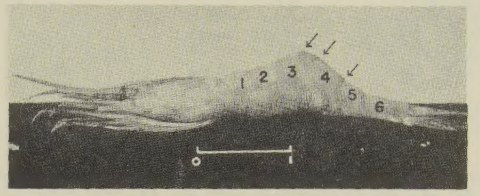

FIG. 1.—The "Pink" shrimp, *Pandalus borealis*. Arrows indicate spines, two on third segment and one on fourth segment of abdomen.

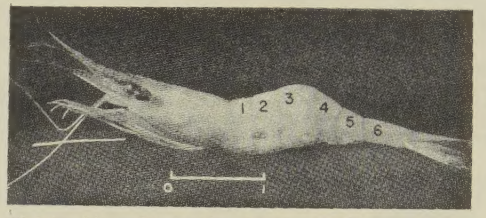

FIG. 2.—The shrimp caught in Stuart Channel, *Pandalus jordani*. Spines are absent from third and fourth segments of abdomen.

2.3 (Cross Reference: 1.2)

a strip off the belly. The entrails are drawn out, and the herring is then conveyed towards a set of knives which cut the fillets. The fillets come out the opposite end of the machine. The right and left fillets come out through different furrows. The waste (head, bones, and entrails) comes out through a furrow on the right side. The machine can easily be handled by one person.

The company will soon place a smaller filleting machine on the market, one which will fillet small-size herring and sprats, or other fish of comparable size.

2.9 (Cross Reference: 3.39)

mortality rate is said to be about 60 percent. There is no known specific antidote.

Because of the widespread and apparently growing use of these fishes for food, as well as the growing interest in the fisheries of the tropical Pacific, the problems connected with the proper utilization of them are becoming increasingly important. This investigation was undertaken to obtain more information on the subject.

Tissue extracts were prepared from samples of the muscle, liver, gonads and intestines of four common Japanese puffers. Samples of the same specimen were tested both before and after the canning process in order to determine the heat lability of the toxin. (It is a well-established fact that the toxin is not destroyed by ordinary cooking methods.)

The virulence of the extracts obtained from the muscle, liver and gonads of some of the specimens of Sphoeroides rubripes chinensis and S. v. vermicularis was markedly attenuated but not completely destroyed. Extracts from the liver and gonads of S. v. radiatus were only slightly affected by the heating process and continued to be strongly positive. In the case of S. v. porphyreus and certain specimens of S. v. chinensis, S. v. radiatus, and S. v. vermicularis, the toxins were found to be heat labile. Apparently the property of heat lability is subject to a wide degree of fluctuation.

6.139 THE PROBLEM OF HEAT INJURY TO DIETARY PROTEIN

Frazier, L. E.; Cannon, P. R.; and Hughes, R. H. (Department of Pathology, University of Chicago)
Food Research 18, No. 2, 91-103 (March-April, 1953)

A number of experiments were performed for the purpose of securing additional information about the effect of heat upon dietary proteins. Samples of amino acid solutions and of protein were subjected to heat treatment at different temperatures for various intervals of time. Mixtures of protein and carbohydrate and mixtures of amino acids and carbohydrates were compared for their respective vulnerability to heat damage. In some instances the effects of amino acid supplementation, hydrolysis, pH, concentration of reactants, and differences between wet and dry heat were also studied. The rat-repletion method was used to measure the extent of the heat injury. Nitrogen intake, fecal nitrogen values, and degrees of protein repletion indicated that the primary cause of nutritive failure was indigestibility of the heated protein.

Fibrin failed to produce protein repletion in rats when it was treated as follows:
(a) Subjected to dry heat for 30 minutes at 410°F. (210°C.).
(b) Mixed with equal parts of the following carbohydrates and subjected to dry heat for 30 minutes at the following temperatures:
(1) cornstarch, 410°F. (210°C.),
(2) sucrose, 374°F. (190°C.),
(3) glucose, 329°F. (165°C.),
(4) fructose, 320°F. (160°C.).
(c) Mixed with equal parts of glucose and autoclaved wet for 120 minutes at 235.4°F. (113°C.).

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 ABSTRACTER: Martin Heerdt

6.193 THE NUTRITIVE VALUE OF FISH MEAL AND CONDENSED FISH SOLUBLES. VII. HERRING AUTOLYSATES, FERMENTATION PRODUCTS, CONDENSED SOLUBLES, AND MEAL AS SUPPLEMENTS FOR CHICK STARTING RATIONS

Tarr, H. L. A.; Biely, Jacob; and March, B. E. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 27-29 (March, 1953)

The authors prepared two lactic acid bacteria fermented fish products. These were then compared with typical commercial flame-dried herring meal, 1951 commercial condensed herring solubles, an acidic enzyme autolyzate of whole herring, and whole, blended, raw herring as supplements to an all-vegetable protein chick starting ration. All of the products except the solubles were prepared from the same lot of November 1951 herring. Minus 4°F. storage was used to preserve the herring meal and the whole herring for several months prior to use.

To prepare the autolyzate, whole herring were minced in a silent cutter, blended with concentrated hydrochloric acid until a pH of 3 was attained, and allowed to undergo self digestion for 48 hours at 98°F. The resulting liquid, which had a pH of 4.1, was stable and resistant to bacterial attack when stored at 32°F. The lactic acid bacterial fermentation products were prepared by blending together 3610 grams of whole minced herring, 200 grams of cane sugar, 160 grams of soybean meal, and sufficient concentrated hydrochloric acid to lower the pH to 5.0. One-half of the foregoing blend was inoculated with a pure culture mixture containing equal amounts of Lactobacillus plantarum, L. casei, and L. shermannii and incubated for 5 days at 86°F.; the other half was inoculated with a Danish lactic acid bacteria preparation compounded for the fermentation of fish materials

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 ABSTRACTER: Martin Heerdt

7.89 STUDIES ON METHOD OF ESTIMATING FRESHNESS OF FISH

Tomiyama, T.; Yone, Y. and Ide, K.
Bulletin of the Japanese Society of Scientific Fisheries 16, No. 12, 17-21, 22-24 (1951)

I. Estimation of freshness by determining the catalase activity of the gill.

In seeking a new test for determining the freshness of fish, manometric observations were made on the catalase activity of the tissues of the gills. No change associated with spoilage was found in this activity when determinations were made on homogenized gill tissue; but determinations on unhomogenized samples of gill showed a marked increase of catalase activity corresponding with the increase in the volatile bases of the flesh. Approximately similar values for catalase activity were obtained for several species of fish at the time when the flesh contained 0.03% of basic nitrogen.

II. The relation between the freshness of the flesh and the catalase activity of the gill determined by the manometric method.

A monometric apparatus for determining the catalase activity of fish gill is illustrated. It is convenient to express the catalase activity as the reading of the mercury manometer 3 minutes after mixing a 400 mg sample of gill tissue with 5 ml. of 3% hydrogen peroxide. The increase in the catalase activity of the gill as spoilage advances is shown to be due to decomposition of the surface layer of the gill, exposing the catalase-rich tissue beneath. Catalase activity of gill and volatile basic nitrogen of flesh are closely correlated.

 (The above abstract appears in Food Science Abstracts 25, No. 1, 26, January, 1953 and is reprinted here)

7.879 A NEW METHOD FOR MEASURING THE DEVELOPMENT OF RANCIDITY

Neumer, John F. and Dugan, L. R. (American Meat Institute Foundation, University of Chicago)
Food Technology 7, No. 5, 191 (May, 1953)

A modified Lappin and Clark (Analytical Chemistry 23, 541 (1951)) method for carbonyl groups has been adapted to the determination of rancidity in dog food. The reaction between the carbonyl group of the fat in benzene and a saturated solution of 2,4-dinitrophenylhydrazine solution in methanol produced a color whose intensity was measured in a spectrophotometer at 480 millimicrons.

Stability of the fat in dog food was measured by aerating the meal sample in a special aeration tube held at a temperature of 97.5°C. At intervals the gases from the aerated meal were collected in benzene and the carbonyl groups determined as above. Plotting of aeration time against either carbonyl or peroxide content gave similar curves.

 ABSTRACTER: M. E. Stansby

HEAT INJURY TO DIETARY PROTEIN

MEASUREMENT OF FISH FRESHNESS

NUTRITIVE VALUE OF HERRING MEAL AND SOLUBLES

MEASUREMENT OF RANCIDITY

6.139 (Cross Reference: 6.195)

When fibrin was subjected to dry heat at 410°F. (210°C.), the loss in protein quality that resulted could not be restored by supplementation with various combinations of the minimum quantities of the essential amino acids until all 9 were provided (table 2, omitted). Hydrolysis restored a large proportion of the protein quality lost when fibrin was inactivated by dry heat or when a fibrin-glucose mixture was inactivated by autoclaving.

Both casein and casein mixed with cornstarch were inactivated when subjected to dry heat at 392°F. (200°C.) for 30 minutes. The presence of the reducing sugar, galactose, in the casein is believed to be responsible for inactivation taking place at a temperature below the inactivation temperature of fibrin.

A mixture of amino acids subjected to dry heat at 365°F. (180°C.) for 30 minutes also became nutritionally ineffective for protein repletion. In this instance, the presence of a large number of free reactive groups on the amino acids is responsible for inactivation taking place at a temperature below the inactivation temperature of fibrin.

Autoclaving a 5 percent solution of amino acids in the presence of an equal concentration of glucose at 240.8°F. (116°C.) for 120 minutes caused no nutritional damage. At a pH of 9, however, autoclaving at 240.8°F. (116°C.) for 60 minutes resulted in a complete inactivation of the mixture. Increasing the concentration of the reactants decreased the length of time of autoclaving necessary to nutritionally damage the mixture of amino acids and glucose.

6.193

and incubated for 6 days at 77°F. At the conclusion of incubation both fermentation products had a pH of 4.5. The preparations were stored for two weeks at 32°F., a temperature at which they appeared to be stable.

Table I shows the manner in which the fish materials were used to supplement the basal ration and the results obtained. Each supplemented ration was fed over a 5-week period to 42 White Leghorn chicks of mixed sex.

Table II shows the effect of adding a vitamin mixture, with and without aureomycin, to the basal and supplemented rations, and the results obtained. In this instance each ration was fed over a 33-day period to 24 New Hampshire cockerel chicks. According to Table II, the only fish material supplement that stimulated growth was the herring meal. Aureomycin, however, resulted in additional growth in every instance where it was added. An explanation for the failure of the other fish materials is being sought.

TABLE I.—Average weights of chicks in Test 1.

Diet No.	Supplement to basal diet	Weight in grams
1	None	312
2	2.5% Herring meal	342
3	5.0% Herring meal	354
4	2.5% Condensed herring solubles	358
5	5.0% Condensed herring solubles	341
6	2.5% Ground whole herring	347
7	5.0% Ground whole herring	363
8	2.5% Autolyzed herring	336
9	5.0% Autolyzed herring	334
10	2.5% Herring fermentation product (commercial)	319
11	5.0% Herring fermentation product (commercial)	341
12	2.5% Herring fermentation product (laboratory)	345
13	5.0% Herring fermentation product (laboratory)	345

TABLE II.—Average weights (grams) of chicks in Test 2.

Supplement to basal diet	None	Vitamin* mixture	Vitamin mixture* plus aureomycin†
None	408	411	477
5% Herring meal	480	476	522
5% Ground whole herring	400	405	463
5% Autolyzed herring	400	394	442
5% Herring fermentation product (laboratory)	381	382	434

* See text.
† 4.5 mg. per lb. (from Aurofac A, Lederle Laboratories).

4.91 CHEMICAL CHARACTERISTICS OF TURKEY CARCASS FAT AS A FUNCTION OF DIETARY FAT

Klose, A. A.; Mecchi, E. P.; Behman, G. A.; Lineweaver, Hans; Kratzer, F. H.; and Williams, Delbert
Poultry Science 31, No. 2, 354-359 (March, 1952)

Groups of turkeys were fed for 17 weeks on a practical ration, on a simplified low-fat basal diet, and on the basal diet supplemented with 2 percent levels of beef fat, corn oil, linseed oil, sardine oil, and soybean oil, respectively. Analyses of the feed fat and carcass fat for their fatty acid contents demonstrated significant correlation between diet fat and carcass depot fat for linoleic acid and linolenic acid contents. The content of total saturated fatty acids in the depot fat was maintained at a fairly constant level by the turkey. There were no significant differences in fatty acid composition between 3 widely separated depots in the carcass. With respect to the unsaturated fatty acids, the fatty acid composition of depot fats of commercially raised turkeys was shown to be largely a reflection of the fatty acid composition of the dietary fat. Depot fat synthesized by the turkey on a low fat diet was roughly estimated to contain 28 percent total saturated fatty acids and 68 percent oleic (and hexadecenoic) acid.

Induction periods of the depot fats were correlated in general with fatty acid composition, the linolenic acid content being most influential in contributing toward instability in the groups studied. Depot fat stability was very responsive to dietary fat changes; compared to average commercial stability, represented by stock diet or soybean oil groups, the linseed oil and sardine oil groups were much less stable, while the corn oil, beef fat, and low-fat groups were significantly more stable.

Author's summary

4.11 FATTY ACID COMPOSITION OF FISH OILS. II. HERRING OIL

Swain, Lyle A. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 24-26 (March, 1953)

Two British Columbia herring oils were examined for fatty acid composition. Sample 1 was prepared in January 1952 from six-day-old herring caught near Prince Rupert. Sample 2 was prepared in the summer of 1952 from herring caught off southern Vancouver Island. After alkali refining for the removal of traces of free fatty acid, the oils were filtered, dried, and stored in bottles under nitrogen at -13°F.

Ether solutions of the oils were warmed with methanol in the presence of a small quantity of alkali and the glycerol released was extracted with water to leave the methyl esters of the fatty acids and the unsaponifiable matter in solution. The residue remaining after removal of the ether was fractionated into simpler mixtures of compounds by low temperature crystallizations from acetone at -13°F. and -103°F. Each of the fractions was circulated repeatedly in a molecular still at a pressure approximating 0.01 mm. of mercury. Distillate was collected in 6-gram portions as the temperature was slowly raised to 190°F. Each portion was subjected to a saponification equivalent and an iodine value determination. Some of the data obtained were converted by methods of calculation into the fatty acid composition values shown in Table I (this card, over). The unsaturation of some of the specific fractions obtained by crystallization and distillation appear in Table II (over).

About 15 percent of the fatty acids in British Columbia herring oil contain three or four double bonds per molecule and fall into the long carbon chain classification. Almost 50 percent of total fatty acids in British Columbia herring oil contain 20 or more carbon atoms per molecule.

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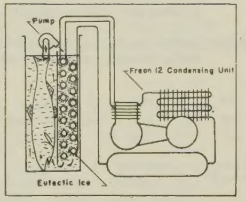
 ABSTRACTER: Martin Heerdt

3,234 BRINE FREEZING OF FISH

Harrison, J. S. M. and Roach, S. W. (Pacific Fisheries Experimental Station, Vancouver, B.C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 3-4 (March, 1953)

Fish frozen at sea retain their fresh quality much better than iced fish; however, freezing aboard the vessel presents numerous problems. Because the use of brine as a freezing medium has many advantages, the Vancouver Station is studying means of applying it to British Columbia fishing vessels, fish species, and market forms.

The work thus far has been confined to the freezing equipment shown below. This apparatus uses as a freezing medium an eutectic solution of sodium chloride, i.e., one containing 23.3 percent sodium chloride by weight, which freezes at -6°F. to a homogeneous eutectic ice without preliminary separation of either water ice (as from a weaker brine) or solid salt (as from a stronger brine).



To prepare the freezer for use, the brine is cooled to its freezing point; in addition, a considerable quantity of eutectic ice is allowed to accumulate on the evaporator coils. Placing fish in the freezer causes the temperature to rise for a few minutes, but constant operation of the circulating pump soon returns the brine temperature to -6°F. Freezing brine onto the coils prior to starting permits cooling to the lowest available temperature and provides a reserve of refrigeration in the form of eutectic ice which can be accumulated in slack periods.

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 ABSTRACTER: Martin Heerdt

8.51 ANALYSIS OF BRITISH COLUMBIA RATFISH

Anonymous
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 23 (March, 1953)

The commercial dogfish and herring fisheries of British Columbia occasionally catch fairly large quantities of ratfish (Hydrolagus colliei) incidental to their operations. As a result, ratfish have become mixed with herring intended for manufacture into oil and meal. Ratfish are closely related to the cartilaginous sharks, skates, and rays; consequently, it is reasonable to suspect that their flesh, like the flesh of the cartilaginous fishes, might contain considerable urea. Since urea contains 46.7 percent nitrogen as compared with about 16 percent nitrogen in proteins, artifically high results could arise from a regular protein assay of a fish meal made from herring and ratfish.

To determine what extent of error could result, Mr. P. J. Schmidt of the Vancouver station analyzed a representative sample consisting of six ratfish having a combined weight of 17.3 pounds. His summarized analyses of whole ratfish are as follows:

Protein (corrected)	11.6%	Urea	1.22%
Mineral matter	1.2%	Ammoniacal nitrogen	0.05%
Fat	18.1%	Urea and ammoniacal nitrogen, calculated as protein	3.74%
Moisture	69.6%		

An ordinary protein assay of ratfish, uncorrected for urea, would show about 15.3 percent protein in the raw whole fish and be considerably in error. Urea, however, is water-soluble so that much of it passes into the stickwater during manufacture of the

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 ABSTRACTER: Martin Heerdt

3.234

The possible adverse effects of brine freezing are an excessive accumulation of salt in the flesh, difficulty in applying an ice glaze, and the rancidity accelerating effect of salt. Typical analyses for salt in three different species of brine frozen fish that had been rinsed in fresh water immediately after freezing are shown in the table below.

Species	Salt content (% of total weight)			
	In skin	First ¼ in. under skin	Second ¼ in. under skin	Central portion
Spring salmon	1.29	0.15	0.15	0.15
Chum salmon	6.29	0.27	0.28	0.28
Grey cod	3.37	0.66	0.38	0.23

From a palatability standpoint, the salt content of even the first layer under the skin is well below the generally accepted 1 percent level. Brine-frozen fish that had been rinsed after freezing appeared to take as good a glaze as air-frozen control samples; however, further storage studies are in progress to determine the effectiveness of this glaze. The lower storage temperatures now in use may be the reason that washed, brine-brozen fish will take and retain an ice glaze in contrast to past experience.

Theoretically, freezing at -6°F., or the eutectic freezing point, will keep salt penetration at a minimum.

Actually, however, freezing can not be carried out exactly at -6°F. On small fishing craft, a brine tank 16 by 30 by 36 inches in size operated by a 5-h.p. condensing unit could freeze 100 pounds of fish per hour.

8.51 (Cross Reference: 1.79)

fish meal. Occasionally, enough urea remains in the meal to cause an error in the calculated protein values. Allowance is usually made for this type of error in assays of dogfish meals.

4.11 (Cross Reference: 1.2)

TABLE II.—Unsaturated fatty acids (as % of total fatty acids) in certain fractions of herring oil methyl esters.

Carbon atoms per molecule	16	18	20	22
	From January herring in northern B.C.			
Crystals at –105°F.			4.5 (3.5)*	2.5 (3)
Mother liquor at –105°F.	6.3 (3)	15 (4)	11.3 (7)	3.0 (8)
	From summer herring in southern B.C.			
Crystals at –105°F.		4.8 (3.5)	7 (3)	6.7 (3.5)
Mother liquor at –105°F.	5.0 (2.5)	17 (4.5)	11.6 (7)	3.8 —

* Figures in parentheses represent the approximate hydrogen atom deficiency (unsaturation, or cause of iodine value) in the fatty acids.

TABLE I.—Fatty acid composition of herring oil (% by weight).

Sample \ Carbon atoms per molecule	Saturated					Mono-unsaturated					Unsaturated*					
	12	14	16	18	20	12	14	16	18	20	14	16	18	20	22	24
A. From January herring caught in northern B.C. (*Clupea pallasi*)																
1	0	1.9	9.5	3.1	0.1	0	0.4	3.5	8.0	1.4		5.4	22.0	30.0	11.5	2.0
2	0	1.7	11.5	5.7	0.1	0	0.2	4.2	6.0	2.3		7.8	18.5	23.2	13.4	5.4
B. From summer herring caught in southern B.C.																
1	1.0	2.8	11.4	4.8	0.4	tr.	0.3	4.4	4.3	1.3		5.2	21.3	24.0	17.5	0.6
2	0	3.4	12.3	4.9	0.2	0	0.6	4.5	5.0	0.2		5.6	25.8	31.2	6.4	0
C. From spent October herring landed in England (Lovern) (*Clupea harengus*?)																
		6.6	13.7	0.5							0.2	4.9	16.3	28.7	29.1	
D. From July herring landed in England (Lovern)																
		8.3	12.1	0.3							0.5	6.4	21.0	28.3	23.1	

* In A and B some portion of mono-unsaturated acids is present in these fractions. In C and D all unsaturated acids appear together.

2.19 RELATIVE IMPORTANCE OF THE FACTORS CAUSING SPOILAGE OF FISH IN BOATS AT SEA

Castell, C. H. and MacCallum, W. A. (Fisheries Experimental Station, Halifax, N. S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 17-23 (March, 1953)

Fish that had been treated aboard fishing vessels in different ways, after treatment and subsequent filleting and storage of the fillets at 36°F., were evaluated for quality by organoleptic means, by trimethylamine test, pH determination, and bacterial count. Of all the precautions that can be taken at sea, by far the most important is keeping the temperature of the fish as low as possible. This involves use of an adequate amount of ice properly applied, and prevention of fish lying on deck in the hot sun prior to icing. Of secondary importance is prevention of gross contamination of the fish by bacteria. This is accomplished by use of uncontaminated ice and avoiding dirty pen boards or other sources of bacterial contamination.

Washing the fish at sea to reduce bacterial contamination, or even dipping them in a disinfectant solution containing 1,000 parts per million of available chlorine did not significantly improve the quality or keeping quality of the fish. Avoidance of bruising the freshly-caught fish in the checker, as by avoiding trampling on them by fishermen wearing rubber boots, also did not improve the quality of the fish. This factor, however, applies only to the freshly-caught fish; fish in which spoilage has already begun are harmed considerably by rough handling.

 ABSTRACTER: M. E. Stansby

6.18 LIQUID FERTILIZERS LEAD IN NEW APPLICATIONS OF FISH BY-PRODUCTS

Anonymous
Journal of Agricultural and Food Chemistry 1, No. 3, 206-207 (April 29, 1953)

A Bellingham, Washington consultant reports that newer and greater markets can be expected for liquid fertilizers from fish. Types of fertilizers now in use include: a 50-percent solids product (fish solubles) which has a nitrogen-phosphorus-potassium analysis of 5-2-2; an enzymatic hydrolyzate of tuna viscera analyzing 2-1-1; and chemically hydrolyzed fish offal analyzing 10-6-5 when built with urea and potassium phosphate.

The consultant feels that there is qualitative evidence to show that growths with these liquid products are considerably above what would be expected on a strict basis of nitrogen-phosphorus-potassium content. The reason for this apparently enhanced growth is thought possibly to be that these "natural" products have just the right trace element ratio for optimum growth. Also, the nitrogen in these products is linked to carbon in contrast to nitrate nitrogen. Studies have indicated that more plant energy is required to utilize inorganic than organic nitrogen, thus reducing growth despite a higher nitrogen content on a pounds-per-acre basis.

After only three years of commercial development, production of liquid fish fertilizers has risen to several hundred thousand tons.

Another use for fish solubles has also been developed. The solubles are being combined with molasses and screenings from flour mills to give a product that is chopped

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 ABSTRACTER: Roy C. Stevens

6.192 BIOCHEMISTRY AND INCREASED LIVESTOCK PRODUCTION

Duckworth, John
Chemistry & Industry, No. 15, 333 (April 11, 1953)

As far as poultry is concerned our results now show that too much emphasis has been placed on the need for animal by-products in their rations. We have found, for instance, that it is only the bird that is laying eggs for hatching and that is housed intensively during this period, that needs to be provided with the "animal protein factor," or vitamin B_{12}, in the ration. Although it is not possible to say that no ration, whatever its character, will not be improved for egg-production by adding vitamin B_{12} there is no evidence yet of a critical need for the factor.

When the breeding hen is on range she obtains almost all the vitamin B_{12} she needs to maintain normal hatchability of her eggs and normal viability of the chicks that hatch from them. Even in winter when the lower forms of life on which the bird preys are scarce she still obtains from the few available, and from the soil, almost all the vitamin B_{12} she needs.

Provided that chicks are hatched with normal body reserves of vitamin B_{12} they need only a small supply of the vitamin in their rations, and this for but the early part of the growing period. Even when the ration contains no vitamin B_{12} and when, in addition, the chicks are denied access to their droppings, as a source of the vitamin, they do not suffer severely. Admittedly, the chick that has to depend on the reserves of vitamin B_{12} in its body when it is hatched grows more slowly than a chick provided with vitamin B_{12} in its ration. But this slackening of the growth rate is transitory. After the short period of slow growth there is an acceleration and the deprived chick eventually catches up

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6.137 "WET STEAM" UPGRADES FISH OIL

Anonymous
Chemical Engineering 60, No. 5, 122 (May, 1953)

A polymerization process recently developed by a German firm reportedly will make fish oil permanently tasteless and odorless, about as digestible as olive oil, and stable for at least 3 years. Details on the nature of the polymerization reaction have not been released; however, the process is based on the use of a special type of saturated wet steam having the water portion in the form of a fine fog-like dispersion.

Pretreatment of the oil prior to entering a reactor usually consists of neutralization with sodium hydroxide, bleaching for the removal of color and slime, and stearine removal by chilling and filtering. Polymerization is carried out at 200° - 250°C. under high vacuum in a jacketed chamber that is indirectly heated with steam. It is claimed that the introduction of the special steam into the heated feed stock, which is under vacuum in the reactor, causes the steam to expand or explode and form superheated steam. Expansion of the particles of water reportedly plays a part in the reaction that results in a polymerization involving a rearrangement of molecules only. As a result of the molecular rearrangement the iodine number of one particular oil declined from 128.3 to 95.4. Structural changes such as would result from a condensation reaction are not involved. Furthermore, only a negligible amount of decomposition occurs in contrast to the older polymerization processes.

Commercial plants already in operation in Iceland, Norway, Denmark, Germany, and England are polymerizing from 20 to 50 tons of roe oil per day. The resulting oil is presently being used in the manufacture of margarine, mayonnaise, and in the canning of

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 ABSTRACTER: Martin Heerdt

SPOILAGE OF FISH ABOARD VESSELS

ALL-VEGETABLE RATIONS IN POULTRY FEEDING

LIQUID FISH FERTILIZERS

NEW POLYMERIZATION PROCESS

6.192

in weight with the chick receiving vitamin B_{12}. Furthermore, it comes into lay as soon as the bird fed on animal by-products and lays as well during its pullet year.

Our experience is somewhat different from the experience of American workers in this field. We have succeeded in tracing the cause of this: soybean meal. By comparing a series of typical U.S. and U. K. rations, we were able to show that when soybean meal is used as the main source of supplementary protein in the rations of breeding stock, their requirement for vitamin B_{12} was much higher than when groundnut meal was used as the source of extra protein.

During these investigations we have studied the effects of adding various concentrates of the "animal protein factor," such as "condensed fish solubles," to rations containing no animal by-product. As far as poultry feeding is concerned we have found no benefit from such additions, provided that the rations were otherwise properly balanced. Admittedly, there are many types of all-vegetable rations that can be improved by adding "condensed fish solubles" to them; but this is because the rations lack something as well as the "animal protein factor" while "condensed fish solubles" contains factors in addition to the "animal protein factor." In making up rations from materials of plant origin alone it is possible to run into a deficiency of riboflavin and such rations are benefited by the addition of "condensed fish solubles" because it is a source of this vitamin. However, riboflavin can be obtained much more cheaply by including in the ration a small amount of grass meal of high protein content, or by adding synthetic riboflavin.

Our work on all-vegetable rations, based on British cereals, for use in laying batteries indicates that when such rations contain 14% of protein the needs of the bird are met. It is possible that a level lower than this might be satisfactory, and work along this line is continuing.

6.137

fish in oil. As much as 40 percent of the oil normally used in making margarine can be replaced with polymerized fish oil, the only limiting factor being hardenability.

2.19 (Cross References: 2.00, 2.08)

6.18 (Cross Reference: 6.55)

into pellets and fed from the air to range cattle during the winter months.

0.115 A COMPENSATED RECIPROCATING LABORATORY SHAKER

Tessier, H.
Canadian Journal of Technology 31, No. 1, 34 (January, 1953)

Common defects of laboratory shakers designed to produce a violent reciprocal motion include: excessive vibration, belt-slip, discontinuous speed variation, and a tendency for the shaker to migrate. The apparatus described in this note eliminates these defects.

The completed shaker (Fig. 1) consists of two aluminum trays, 18 in. by 18 in. by 7 in. deep, mounted on carriages running on rails. The supporting frame is of welded 1 1/4 in. iron pipe covered on all sides with an aluminum skirt. One side of the skirt is removable to allow easy access to the drive mechanism. For mobility, the unit is mounted on swivel casters.

Samples are held in the trays by snugly fitting fiberboard inserts, cut to accommodate the particular flasks being used (1). Each tray and carriage has a travel of two inches at rates of from 40 to 240 strokes per minute.

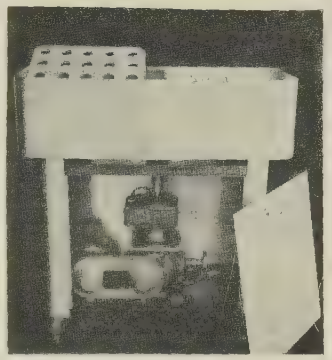

FIG. 1.

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8.51 AMINO-ACID CONTENT OF SALMON ROE

Seagran, Harry L. (Fisheries Experimental Commission, Ketchikan, Alaska)
Commercial Fisheries Review 15, No. 3, 31-34 (March, 1953)

Because of the high (23 to 29 percent) protein content of salmon eggs it was considered desirable to study their amino-acid composition. The work was limited to determinations of the "essential" amino acids, using the microbiological assay technique.

Samples of roe from the five species of salmon, in varying degrees of sexual maturity, were obtained in a random manner, sorted as to relative maturity, sealed in cans, and frozen at -20°F. The frozen samples were stored at 0°F. until needed for analysis.

Crude protein samples were prepared as follows: The eggs were thawed then blended with acetone in an electric blender. The samples were covered with additional acetone and permitted to stand overnight. They were then subjected to continuous Soxhlet extraction with acetone for 20 hours. The residue was dried in a vacuum oven (29 inches of mercury vacuum) at 40°C. for one hour, and finely ground. The dry and fat-free samples were stored in airtight containers.

The microbiological procedure and media of Henderson and Snell (1948) were used. This method employs various lactic acid-producing bacteria with a single uniform medium. Acid production was measured by electrometric titration. Streptococcus faecalis R (A.T.C.C. #8043) was used as the assay organism for arginine, leucine, methionine, threonine, and valine; Leuconostoc mesenteroides (A.T.C.C. #8042) was used for histidine, isoleucine, lysine, and phenylalanine; and Lactobacillus plantarum (A.T.C.C. #8014) was used for tryptophane.

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 ABSTRACTER: Roy C. Stevens

1.0112 ALASKA'S SHRIMP INDUSTRY

Wigutoff, Norman B.
Commercial Fisheries Review 15, No. 3, 19-24 (March, 1953)

The shrimp fishery is one of Alaska's oldest and most important "off-season" fisheries. The salmon and halibut seasons are very short and occur during the summer months, but except for a short closed season in certain areas, the shrimp fishery can be exploited on a year-round basis.

The five species of shrimp that are taken in commercial quantities are the pink, Pandalus borealis; side stripe, Pandalopsis dispar; humpy, Pandalus goniurus; spot or prawn, Pandalus platyceros; and coon-stripe, Pandalus hypsinotus. Of these, the first three make up from 85 to 95 percent of the commercial catch divided almost equally among them. The sizes of the pink and humpy vary from about 60 to 150 whole shrimp per pound. Side-stripe range from 20 to 75 whole shrimp per pound. The spot or prawn are the largest, averaging 8 to 10 whole shrimp per pound. Coon-stripe run about 30 to 50 whole shrimp per pound. The average annual catch of all species is about 2,150,000 pounds.

Shrimp fishing in Alaska is conducted in "inside" waters, mainly in glacial bays with shallow mouths, near the flats off the mouths of large rivers, and near banks along open channels and inlets. New commercially exploitable areas have recently been found as a result of the shrimp explorations of the U. S. Fish and Wildlife Service exploratory vessel John N. Cobb.

The shrimp are taken by a type of gear known as the beam trawl. This consists of a partially tapered bag of netting whose mouth is spread by a beam or timber. After a drag

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 ABSTRACTER: Roy C. Stevens

0.5 THE EFFECT OF FASTING ON THE BACTERIAL FLORA OF THE INTESTINE OF FISH

Margolis, Leo (McGill University, Ste. Anne de Bellevue, Province of Quebec)
Journal of the Fisheries Research Board of Canada 10, No. 2, 62-63 (April, 1953)

The presence of a bacterial flora in the intestines of fish is generally believed to depend entirely upon the recent intake of food and the degree of contamination of the food and water. To check this opinion the author kept a number of live fish in troughs with an ample supply of running well-water, but without feeding them. Sixteen common bullheads (Ameiurus nebulosus) and three speckled trout (Salvelinus fontinalis) were used to observe the effect of holding without feeding upon the microflora of the gut.

Before subjecting the experimental fish to fasting, three additional bullheads and two additional trout were examined for intestinal bacteria within two hours after they had been fed. These fish had food in their intestines. After the 16 bullheads had been one to two months without food and the 3 trout had been seven to ten days without food, their intestinal contents were likewise examined for bacteria. In the latter instance the gut samples consisted of mucus, which is always present in the intestine.

In making the examinations for bacteria, all fish were opened aseptically and the intestine, after having been seared on the surface, was slit in the anterior, middle, and posterior regions. One or two loopfuls of intestinal material from each region were inoculated into each of two nutrient broth tubes and plated on each of two rabbit blood agar plates. Tubes and plates were incubated both aerobically and anaerobically at 20° - 25°C. and observed over a period of 3 weeks. Bacterial growth was obtained in all broth and on all plate cultures made from the intestinal contents of fish that had eaten two hours

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 ABSTRACTER: Martin Heerdt

1.0112 (Cross Reference: 1.85)

of an hour or two the trawl is hauled up from the bottom and the shrimp are brailed out and stored on deck in wooden boxes holding from 150 to 200 pounds each. Because of the cool air temperatures that prevail and the fact that the shrimp are landed daily, no ice is used.

On arrival at the plant the whole shrimp are immediately precooked, one boxful at a time, in a tank of fresh boiling water heated by direct injection of live steam. This simplifies the picking operation. After picking and washing, the meats are usually cooked in a strong salt solution (25° - 30° salometer) from one to three minutes. Another method employed is to first dip the trays of picked meats in a saturated salt solution for about three minutes. After the dip, the trays of meats are allowed to drain. Then the trays are placed in a steam retort and cooked without pressure for 3 to 4 minutes. When the meats have cooled they are put through a combination shaking and blowing machine to remove any particles of shell or antennae that may remain.

Almost the entire production of the Alaska shrimp industry is now marketed in the frozen state. Freezing is generally accomplished in shelf-type freezers at temperatures between 0° and 10°F. The largest volume of shrimp meats is packed in No. 10 double-seamed cans, 5 pounds of meats per can, for the hotel and restaurant trade. An increasing volume, however, is now being packed in consumer-size, vacuum-sealed cans. These range in size from one pound to four ounces. Vacuum packing provides greater storage life and minimizes the toughening and loss of flavor of the shrimp during long periods of frozen storage.

0.5 (Cross Reference: 2.01)

prior to sampling. From 200 to 400 colonies appeared on each plate.

Broth and plate cultures made from the non-feeding fish showed that 15 of the 16 bullheads and all 3 of the trout were free of intestinal bacteria. Cultures made from the intestinal contents of the 16th bullhead showed the presence of a Pseudomonad in and on both aerobic and anaerobic broth and agar plates, respectively. From 15 to 32 colonies appeared on the plates.

0.115

Details of the driving mechanism are shown in Fig. 2. Two cams (A), set at 180 degrees to one another, are keyed to the vertical drive shaft (B) of a 1/2 h.p. worm gear reducer and Tippen variable speed transmission unit. Motion in opposite directions is imparted to the two carriages (C) as the eccentrics revolve inside the rectangular frames (E). The ball bearing cams (A) are 5 in. outside diameter with press-fitted steel inserts (F), drilled and keyed to shaft dimensions, one inch off center. The bearing surfaces of the aluminum frames (E) are faced with steel strips (G) to minimize wear. These facings also permit adjustment of the clearance between cams and frames.

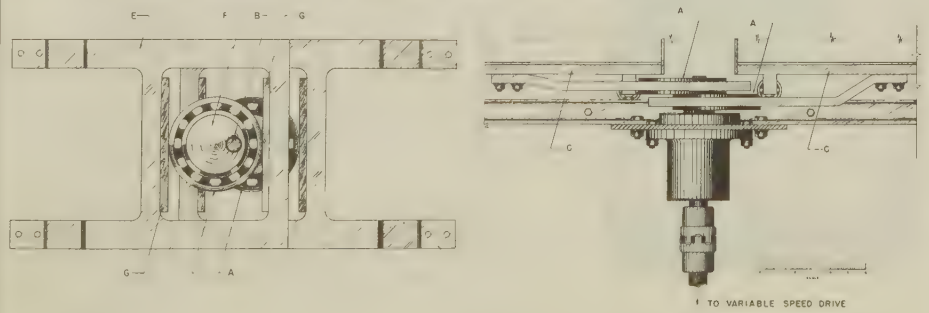

FIG. 2.

8.51 (Cross Reference: 1.30)

To determine the variability of the amino-acid content of egg samples from the same species at the same state of maturity, eight skeins of eggs were selected from eight pink salmon and assayed separately. The results (table 1, omitted) gave no indication of a statistically significant variation.

Six individual skeins of eggs from salmon of identical species (king) but of varying sexual maturity were assayed to determine the effect of degree of maturity on essential amino-acid content. In general, there was an indication that for king salmon roe, the essential amino-acid content showed an increasing trend with maturity (table 2).

To compare the essential amino-acid content of salmon egg samples from the different species, protein samples from moderately mature eggs from the five species of salmon were analyzed. The results (table 3) indicate no significant difference.

Table 2 - Amino Acid Content of Salmon Egg Protein from King Salmon of Varying Degrees of Maturity

Sample	Sample Number	Classification[1]	Size of Eggs--Diameter in Millimeters	Amino-Acid Content (In Grams Per 100 Grams of Protein)[2]								
				Arginine	Histidine	Isoleucine	Leucine	Lysine	Methionine	Phenylalanine	Threonine	Tryptophane	Valine
King Salmon Roe	1	1	2.0 ± 0.5	6.5	2.1	5.3	7.0	6.1	2.4	4.3	5.9	0.3	4.9
	2	1	2.0 ± 0.5	7.2	2.4	6.5	8.5	7.7	2.7	5.0	5.8	0.5	6.1
	3	2	4.0 ± 0.5	7.3	2.5	7.2	9.3	8.5	2.7	5.3	5.5	0.8	6.8
	4	3	7.0 ± 0.5	8.0	2.4	7.5	9.4	9.0	3.1	4.9	5.7	0.8	7.0
	5	4	8.0 ± 0.5	7.7	2.4	7.3	9.6	8.9	3.1	4.8	5.7	0.7	7.0
	6	4	8.0 ± 0.5	7.1	2.4	7.2	9.9	8.8	3.0	4.8	5.9	0.9	7.1
"White Spring Salmon Roe"[2]	-	-	-	5.9	1.4	8.2	11.1	1.8	1.9	6.3	4.7	0.7	7.5

1/AN ARBITRARY SCALE INDICATING DEGREE OF SEXUAL MATURITY. CLASS 1 EGGS ARE VERY IMMATURE, CLASS 4 EGGS, VERY MATURE, AND CLASS 2 AND 3 INTERMEDIATE MATURITY (BETWEEN 1 AND 4).
2/PROTEIN EQUALS NITROGEN TIMES 6.25.
3/DATA OF DEAS AND TARR (1942).

Table 3 - Amino-Acid Content of Salmon Egg Protein from Five Species of Salmon of Similar Sexual Maturity[1]

Sample		Number of Samples Analyzed[2]	Amino-Acid Content (In Grams Per 100 Grams of Protein)[3]								
			Arginine	Histidine	Isoleucine	Leucine	Lysine	Methionine	Phenylalanine	Threonine	Tryptophane	Valine
Salmon Roe	King	1	8.0	2.4	7.5	9.4	9.0	3.1	4.9	5.7	0.8	7.0
	Chum	2	7.6	2.8	7.4	10.2	9.0	3.1	4.8	6.1	0.9	7.2
	Sockeye	2	7.1	2.7	7.6	10.1	8.7	3.0	4.7	5.7	0.8	6.8
	Coho	1	7.3	2.7	8.0	10.2	8.7	3.0	4.9	5.8	0.9	6.8
	Pink	2	7.2	2.8	7.3	9.8	8.9	3.0	4.9	5.6	0.9	7.4
Animal Liver[4]		-	6.5	2.6	5.6	8.4	6.3	3.2	7.3	5.8	1.5	6.2

1/ALL EGGS WERE MODERATELY MATURE AND OF CLASSIFICATION 3. EGG DIAMETERS WERE: KING, 7 MM.; CHUM, 7 MM.; SOCKEYE, 5 MM.; COHO, 6.5 MM.; AND PINK, 5.5 MM. (ALL VALUES TO ±0.5 MM.)
2/PROTEIN EQUALS NITROGEN TIMES 6.25.
3/EACH SAMPLE WAS PREPARED FROM ROE REPRESENTING SIX OR MORE FISH.
4/DATA OF BLOCK AND BOLLING (1945).

4.21 EFFECT OF TEMPERATURE AND ANTIOXIDANTS UPON THE LIPOXIDASE-CATALYZED OXIDATION OF SODIUM LINOLEATE

Tappel, A. L.; Lundberg, W. O.; and Boyer, P. D.
Archives of Biochemistry and Biophysics 42, No. 2, 293-304 (February, 1953)

The effects of temperature from -6° to 30°C. and antioxidants upon the lipoxidase-catalyzed oxidation of aqueous sodium linoleate have been studied. An accurate analytical method for establishing the initial rates of the lipoxidase reaction has been described.

The lipoxidase-catalyzed oxidation of linoleate was found to have a relatively low activation energy, 4300 cal./mole. Complete freezing of the lipoxidase system reduced the reaction rate to less than 1% of that found in the liquid system at the same temperature.

All the phenolic antioxidants tested were found to inhibit the reaction. The greatest inhibitory effect was obtained with nordihydroguaiaretic acid, followed closely by propyl gallate; the effective concentrations were sufficiently low so that these two antioxidants might prove useful in protecting foods from this type of oxidation. The biologically important antioxidant, α-tocopherol, was rapidly oxidized in the lipoxidase system.

Author's summary

4.64 THE USE OF ANTIOXIDANTS IN DRY DOG FOOD

Neumer, John F. and Dugan, L. R. Jr. (University of Chicago)
Food Technology 7, No. 5, 189-191 (May, 1953)

In the development of a dry dog food containing added inedible-grade animal fats, the authors investigated the stabilization of the dog food against rancidity. To facilitate their studies they developed a rapid, precise method for determining the relative stabilities of dry food materials that contain five percent or more of fat. The method is based upon the semi-quantitative detection of carbonyl compounds in the gases exhausted from a meal undergoing accelerated oxidation.

The authors used this carbonyl method in addition to the Schaal oven method to determine the relative stabilities of a number of rations. Their results indicated that added levels of unstabilized, inedible-grade animal fats did not have a deleterious effect on the stability of dry dog food.

Materials in the petroleum ether extractable portion of the dog food limited the effectiveness of the antioxidants in protecting the fat-meal mixes against rancidity. Phenolic antioxidants of the hindered or partially hindered type appeared to be the most effective.

ABSTRACTER: F. Bruce Sanford

8.64 THE VITAMIN B_{12} CONTENT OF CERTAIN FISHERY MATERIALS

Southcott, B. A. and Tarr, H. L. A. (Pacific Experimental Station, Vancouver, B. C.)
Journal of the Fisheries Research Board of Canada X, No. 2, 64-68 (April, 1953)

In preliminary experiments it appeared that higher cobalamin recoveries resulted with enzyme-digested materials than with aqueous autoclaved extracts, and that the aseptic addition of separately-sterilized, appropriately-diluted extracts to the sterilized assay medium, in most instances, gave higher assay values than did the sterilization of such extracts in the culture medium.

Studies were conducted on the susceptibility of vitamin B_{12}-active substances in chum salmon kidney and herring meal to alkali treatment. Over 90 percent destruction invariably occurred following treatment of aqueous suspensions of undigested materials. However, on alkali treatment of papain- and mylase-hydrolyzed kidney, a substantial amount of apparent vitamin B_{12} activity remained. This was probably due to the occurrence or formation of uncharacterized vitamin B_{12}-active substances.

In work previously reported it was found that vitamin B_{12} occurs in natural protein materials largely as hydroxo-cobalamin. It was shown that cyanide treatment of crude herring meal suspensions apparently occasioned only partial reversion of the hydroxo- to cyano-cobalamin. This treatment did not affect the assay values obtained to any important extent, and usually at least 95 percent of the apparent total cobalamins as found by direct assay were recovered following chromatographic separation, elution and assay. In the present work these findings have been verified and extended.

Whole herring (1 in 5 aqueous suspension of blended material) and fish meal samples (1 in 10 aqueous suspensions) were digested for 48 hours under toluene with 5 percent

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ABSTRACTER: Neva L. Karrick

2.19 CONTAMINATED ICE IN THE BOATS AT SEA

Castell, C. H. and Triggs, R. E. (Atlantic Fisheries Experimental Station, Halifax, N. S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 24-26 (March, 1953)

For practical purposes artificial ice is free from contamination because it is usually made from chlorinated water with a very low initial count. During storage, the few bacteria that are present in the ice slowly die until almost none remain. Even natural ice that has been cut from lakes and rivers is free from bacteria, or at most contains relatively few.

Contamination on the surface of the ice, however, is another kind of problem. One of the most important sources of bacteria found on the surface of ice is the insulating material that is generally used to keep the ice from melting during storage in the ice houses. This material usually consists of straw or sawdust in which there are frequently hundreds of thousands of bacteria per gram. Many of these bacteria belong to the type that thrive at low temperatures and are important in the spoilage of fish. As a result, a large population of cold-loving bacteria gradually grows and accumulates in the insulating material at the surface of the ice. Literature on the spoilage of fish contains numerous references indicating that many of the worst types of spoilage organisms can be traced directly to the insulating material used in storing ice. If, however, the ice is thoroughly washed before it is crushed, most of the contaminating bacteria are removed.

Crushed and powdered ice, when stored in the fish hold, comes into intimate contact with all of the surfaces and corners of the fish pens. If fish in the vessel hold are pressed directly against dirty pen boards, they invariably spoil rapidly. Similarly, ice placed against dirty pen boards becomes contaminated. Thoroughly clean pens for the storage of ice that is to be used in icing down the catch, therefore, will do much to keep

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ABSTRACTER: Martin Heerdt

LIPOXIDASE-CATALYZED OXIDATION

VITAMIN B_{12} IN FISHERY MATERIALS

ANTIOXIDANTS IN DRY DOG FOOD

CONTAMINATED ICE ON FISHING VESSELS

8.64

papain in the presence of 100 μg. per ml. of KCN at pH 7.0. Digests or aqueous suspensions were also extracted by autoclaving 5 minutes at 120°C. and pH 7.0 or 4.5 with or without 100 μg. per ml. of KCN. The results showed that enzymic proteolysis, cyanide treatment and autoclaving at pH 4.5 or 7.0 had no important effect on the apparent cobalamin content of the various materials. Hexane extraction had no effect on the cobalamin content, heating caused progressive destruction, and chromatographic separation, elution and assay indicated that the direct assay values were actually due to cobalamins and not to other vitamin B_{12}-active materials. Results also indicated that much of the vitamin remains in the cooked flesh in the conventional cooking and pressing process.

Papain digestion followed by autoclaving at 120°C. for 5 minutes does not liberate more vitamin B_{12} than does water extraction at 100°or 120°C., and it may result in fictitiously high recoveries.

Additional experiments were made using meals which had been prepared in the same plant from the same load of herring. The ideal meal was prepared by drying the presscake in an air tunnel at 39° to 43°C. Samples of this meal were heated in a rotating drum at 149°C. for varying periods. A portion was extracted with hexane. The commercial meal was prepared by direct-flame drying of herring presscake. The fire-box temperature was 538° - 620°C., stack temperature 108° - 125°C., and the meal was discharged at 46° - 54°C. The overheated commercial meal was dried in the same manner with a fire-box temperature of 650° - 928°C., a stack temperature of 158° - 171°C. and the meal was discharged at 79° - 93°C. The results confirmed those of the first experiment. The normal commercial meal and the ideal meal had a similar cobalamin content. Overheating these meals caused destruction of the cobalamin, but hexane extraction had little effect.

2.19 (Cross Reference: 2.01)

contamination at a minimum.

Unused ice also may serve as a source of contamination, particularly if fresh ice is piled on top while the bottom layer of unused ice is allowed to remain in the vessel for several months before it is used for icing fish. The amount of contamination resulting in unused ice as it receives drainage from successive lots of fresh ice placed on top of it presents another interesting problem. Actually, hundreds of test counts will be required before definite figures can be presented on the condition of the ice as generally used aboard fishing vessels in the Maritimes. While these test counts are being made, common sense dictates that clean ice should never be placed in a pen that has not been thoroughly cleaned and scrubbed.

Already instances have been found where the ice in the pens of vessels preparing to leave for the banks contained upwards of 5,000,000 low-temperature fish-spoiling bacteria per gram. In short, each pound of crushed ice to be used in preserving the fish contained as many as 2,250,000,000 fish-spoiling bacteria. It is obvious that washing the fish before icing in the hold is not going to be of much value in reducing spoilage if heavily contaminated ice is used.

4.64 (Cross Reference: 7.879)

6.190 THE VITAMIN-B GROUP IN WHITE FISH MEAL

Pritchard, H. and Wraige, D. R.
Journal of the Science of Food and Agriculture 4, No. 4, 172-175 (April, 1953)

White fish meal possesses protein with biological value higher than that from most sources and contains other factors of nutritional importance. The white fish meal is made from the head, backbone, and flaps of white fish, such as cod and haddock, after the fillets have been removed. The fish come primarily from Iceland, Bear Island and the White Sea. Most of the white fish meal produced in England is prepared in steam-heated dryers of special construction. The drying operation is begun as soon as the trawler discharges its cargo.

In order to establish the level at which certain of the vitamin-B group occur in British-made white fish meal, samples typical of the bulk of material produced were assayed microbiologically. To obtain as representative a series as possible, several samples, each representing a day's output from the largest fish-meal plant in England, were bulked so that the average samples represented the output of meal from material brought in from summer and winter fishing.

The vitamins were extracted as follows: For thiamine and pantothenic acid the meals were digested with papain and takadiastase at pH 4.5. For riboflavin the meals were steamed. For nicotinic acid the meals were autoclaved for 15 to 20 minutes at 15 pounds pressure with N-hydrochloric acid. For pyridoxine the samples were autoclaved at 10 pounds pressure for 1 hour. For vitamin B_{12} the fish meals were steamed with an acetate buffer of pH 5.0 for half an hour. Treatment with cyanide did not increase the amount of vitamin B_{12} found. For inositol the samples were autoclaved with 5 N-hydrochloric acid at 10 pounds pressure for one hour. Choline was extracted by autoclaving in 3 percent sulfuric acid for 2 hours at 10 pounds pressure and was then separated on a Permutit column.

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 ABSTRACTER: Neva L. Karrick

3.5 EFFECT OF PROLONGED STORAGE ON THE FATE OF RED HALOPHILIC BACTERIA IN CONTAMINATED SALT

Dussault, H. P. (Gaspe Fisheries Experimental Station, Grande Riviere, P. Q.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 7-9 (March, 1953)

The Gaspe station recently learned of a salt fish processor who had no difficulty with red contamination either in his plant or in his product. Further inquiry disclosed that this processor purchased only one brand of solar salt that is usually, if not always, contaminated with red halophiles. To avoid paying for excess water, the processor specified old salt that had been stored at least three years after being evaporated.

Because it appeared that prolonged storage might have an effect upon red halophilic bacteria normally present in solar salt, the author decided to investigate. Cultivation of the red halophilic microorganisms was carried out using the new improved medium of Dussault and LaChance (1952). An adaptation of a simple method for counting viable bacteria was also used.

On analysis the sample salt was found to contain 4.15 percent moisture and 1.06 million red bacteria per gram. For the storage tests, approximately 200 grams of this salt, or enough to form a one-inch layer, were placed into two crystallizing dishes. One dish was stored at a constant temperature of 98.5°F. while the other was stored in a cabinet at room temperature, or about 72°F. After two months of storage, samples of the salt were analyzed for moisture and total number of red bacteria. The salt that had been stored at 98.5°F. contained 1.5 percent moisture and 3000 red halophiles per gram; whereas the salt stored at room temperature contained 1.2 percent moisture and 8000 red halophiles per gram.

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 ABSTRACTER: Martin Heerdt

6.15 WHOLE MEAL OR SOLUBLES?

Anonymous
Meldinger S.S.F., No. 12, 10-14 (1950)

Whether stickwater should be used for the production of "whole meal" or of special stickwater products such as "solubles" is discussed. A programme for industry should be sufficiently flexible to meet swift changes of demand. "Whole meal" consists of press-cake + dried stickwater. The 3 methods of drying are as follows: (1) The stickwater is heated in the cooker; special equipment permitting simultaneous evaporation and cooking is required. (2) Stickwater is mixed with partly dried press-cake, which absorbs stickwater more easily than raw or wholly dried press-cake; 2 driers are required. This method might be useful in factories where raw materials are scarce or the supply irregular. (3) The stickwater is concentrated in an evaporator before being mixed with the press-cake. Experiments are in progress to determine to what extent the stickwater should be concentrated. The stickwater should be completely absorbed by the press-cake before the mixture is dried. With this method, additional driers would not be necessary; relatively small alterations in equipment would be required, and "whole meal", ordinary meal, and solubles could be produced. Changing demands would be met more confidently if producers had equipment which could be used for evaporation in a vacuum or under pressure.

(The above abstract appears in Food Science Abstracts 25, No. 1, 21, January, 1953 and is reprinted here)

1.37 CANADA'S LAKE TROUT

Anonymous
Trade News 5, No. 9, 8 (March, 1953)

The lake trout (Cristivomer namaycush) provides one of Canada's most important fresh-water fisheries. Great Slave Lake in the Northwest Territories alone produced a catch of 2,975,000 pounds in 1952. The total Canadian catch in 1951 was 6,490,000 pounds. This had a market value of $1,909,000.

Lake trout have a wide distribution throughout the northern part of the continent, occurring from Labrador to Alaska and south into the northern part of the United States. This species is a member of the Salmonidae family and, in general, grows to a larger size than any other species of trout. Those living in large lakes usually grow to a larger size than those in smaller bodies of water. Specimens weighing as much as 75 pounds have been taken, and 20- to 30-pounders are not uncommon. The average weight of the fish entering the commercial catch is probably about 10 pounds and the length two feet or so.

In Great Slave Lake the lake trout mature at about eight years of age, when they weigh about two and one-half pounds and are about 18 inches long. There is a great difference in rate of growth; some fish are four times as heavy as others at the same age.

Commercial fishing for lake trout in Canada is done mainly by means of gill-nets and pound-nets, although trolls and set hooks are used in some places. Most of the catch is taken during the summer months, but in the Prairie Provinces, as a whole, the greater part of the fish are caught in winter by means of nets set through the ice.

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 ABSTRACTER: Roy C. Stevens

B VITAMINS IN WHITE FISH MEAL

UTILIZATION OF FISH SOLUBLES

EFFECT OF DRY STORAGE ON RED HALOPHILES

CANADIAN LAKE TROUT FISHERY

1.37 (Cross Reference: 1.0111)

The fish are marketed in the fresh and frozen forms, much of the catch being exported to the United States.

6.190

The results obtained were as follows:

Table II

Vitamin-B potencies (μg./g.) of average samples of white fish meal produced in bulk in a factory in Great Britain

	Nov-Dec.	May-June
Moisture	9.56*	10.32*
Thiamine	3.9	2.5
Riboflavin	13.5	5.9
Nicotinic acid	46.0	43.7
Pantothenic acid	11.8	5.55
Pyridoxine	11.2	2.69
Cobalamin	0.12	0.12
Inositol	----	230
Choline	----	4000

* Percent

The tests indicated that the amounts of riboflavin and pantothenic acid tended to be lower in the white fish meal produced in the summer. The values obtained were compared with values available in the literature.

When white fish meal is fed at a 10 percent level, nearly all requirements for riboflavin, nicotinic acid and pyridoxine would be supplied to livestock, and more than a quarter of all requirements to poultry. Inositol and choline are at a high enough level to make a definite contribution to the daily requirement. The requirement for vitamin B_{12} will vary with the type of protein fed. However, the white fish meal contains enough vitamin B_{12} if the diet contains adequate quantities of animal protein, as is the case when 10 percent white fish meal is included in the diet.

3.5 (Cross Reference: 0.5)

More than 99 percent of the bacteria were destroyed as a result of storing the salt at either 98.5°F. or room temperature. It would appear, therefore, that prolonged storage under dry conditions reduces the residual moisture content below the optimum necessary for red halophiles and eliminates them. The actual storage temperature itself does not appear to have any effect upon the reduction of the total numbers of bacteria present. Storage at 98.5°F. resulted in a smaller loss of moisture, primarily because the incubator contained an open dish of water to provide a moist atmosphere for retarding desiccation of culture media in petri dishes.

2.1129 EXPERIMENTS WITH A "FISH PUMP"

Ellson, J. G. (U. S. Fish and Wildlife Service, Seattle, Washington)
Commercial Fisheries Review 15, No. 2, 27 (February, 1953)

To determine the possibilities of catching small fish (for bait or other commercial use) without the use of any customary type of fishing gear, experiments were conducted with a pump and an electric-light arrangement. The experiments were carried out in September and October 1952 off the Oregon and Washington coasts aboard the John N. Cobb, an exploratory fishing vessel operated by the Service's Branch of Commercial Fisheries.

The equipment used for the tests consisted of a 4-inch bladeless impeller pump in combination with powerful underwater lights (as fish attractors). This equipment is illustrated in figure 1.

The boom was swung outboard so that it cleared the vessel's side by about 5 feet. Then the intake pipe and underwater light assembly were lowered to a submerged position 5 to 8 feet below the surface of the water. When in fishing position, the intake pipe and the light beams were perpendicular to the water surface.

A total of eight tests were made between September 9 and October 2, all during the hours of darkness. Except for the 1-hour tests, all trials were for 10 hour periods between 8:00 p.m. and 6:00 a.m. All trials, except a single 1-hour test, resulted in the taking of fish. Catches consisted of individuals from 1 inch to 9 inches in length. The numbers of individual fish taken in the tests were as follows: 0, 61, 12, 23, 5, 11, 1,000 (estimated), 226. The catches were composed mostly of small smelt (1 to 2 inches in length) and herring(4 1/2 to 9 inches in length), and only small numbers of other varieties were taken. Usually when fish were caught, there were good indications of small fish in the area.

Several small herring (approximately 4 1/2 to 6 inches) reached the receiving tank in a living state. These fish were quite active and appeared to have been little affected by

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 ABSTRACTER: J. G. Ellson

2.6 QUALITY CONTROL PROGRAM BUILDS CONFIDENCE

Anonymous
Fishing Gazette 70, No. 4, 43 (April, 1953)

A Philadelphia, Pennsylvania chain of grocery supermarkets has instituted a quality control program for seafoods that has helped to build public confidence and increase sales.

All of the crabmeat sold in these stores is dated. If it is not sold within three days after it is picked, the crabmeat is disposed of. However, because of good purchasing and merchandising very little is actually thrown away. The amount thrown away is estimated at only one-half of one percent.

A bacteriologist, engaged in a special study on crabmeat, was retained by the company to establish quality standards for crabmeat. The company now has only two sources of supply that can meet these standards. Analyses of samples of the crabmeat purchased from both suppliers are made twice a week, and a report of the analysis is sent to each.

A two-day cycle is maintained with oysters. Fresh fish received by the stores must be sold within a day or reduced in price and sold as carried-over fish. In all of the company's stores there are inspectors who check all of the perishables and remove any items with expired dates on them.

These practices have helped to build up public confidence and an enviable reputation for the company.

 ABSTRACTER: Roy C. Stevens

2.114 PEN CONSTRUCTION FOR REFRIGERATED FISH HOLDS

MacCallum, W. A.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 27-29 (March, 1953)

During the past six years tests have been in progress aboard two schooners and two trawlers on the east coast of Canada on cold storage of fresh fish aboard fishing vessels. The results of the tests indicate that (1) a cold-air-jacketed and insulated fish hold is superior to an insulated non-refrigerated fish hold; (2) mechanically constructed joints in metal pen construction do not offer the desired degree of watertightness; and (3) any type of mechanical refrigeration for fresh fish holds is uneconomical for present fishing operations with schooners.

The cold-air-jacketed hold is accomplished by building a sheet-metal liner for the fish hold that is supported out away from the sides of the vessel by spacers. This leaves room for a "jacket" of refrigerated air above, below and at the sides of the metal liner. It has been found that fish chilled in ice to slightly below 32°F. in this type of a refrigerated hold will keep the length of an entire fishing trip.

Certain problems are encountered in construction of this type of liner. All joints must be welded as mechanical joints cannot be made watertight. But the welded joints make a rigid liner without "working" joints to allow for the slight movements of the component members of the ship's hull while at sea. Also, it is a difficult and expensive job to make templates and to cut plates for each individual hold.

These problems can be solved by the construction of sectional pens as shown in the accompanying drawing. These pens are constructed of heavy metal in the shop for later

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 ABSTRACTER: Keith A. Smith

3.17 THE EFFICACY OF BACTERICIDAL ICE IN THE PRESERVATION OF SEA FISH

Partmann, W.
Z. Lebensmitt.-Untersuch. u.-Forsch. 94, 246-264 (1952)

An extensive survey of the subject, under the following headings: (1) the problem of the efficacy of bactericidal agents; (2) dangers involved in the use of preservatives; (3) bactericidal ice melting below 0°C.; (4) the addition of acids and their salts and esters to ice; (5) oxidants, such as peroxide, ozone, or chlorine-yielding substances, in ice, and catadynization; (6) quaternary ammonium compounds; (7) carbondioxide; (8) acridines; (9) nitrite; (10) antibiotics; (11) sulphonamides; and (12) tannins, formalin, and ethylene and propylene oxides. The author considers that a single substance could not possibly counteract the bacterial changes which take place both on the surface and within the fish. Only a subtle combination of several preservatives might be successful in solving a very complex problem.

(The above abstract appears in Food Science Abstracts 25, No. 2, 150, March, 1953 and is reprinted here)

"FISH PUMP" EXPERIMENTS

PEN CONSTRUCTION FOR REFRIGERATED HOLDS

QUALITY CONTROL AT RETAIL LEVEL

BACTERICIDAL ICE

2.114

installation in the vessel. Space is provided for circulation of cold air between the separate pens as well as above, below and to the sides along the hull. Finned evaporator coils or cold plates at one end of the hold can be used to refrigerate the circulating air. Being separate units, the pens are not subjected to strain by the "working" of the boat. Cost of this type of pen construction can be kept at a minimum because of standardization of pen components and fabrication of pens in the shop.

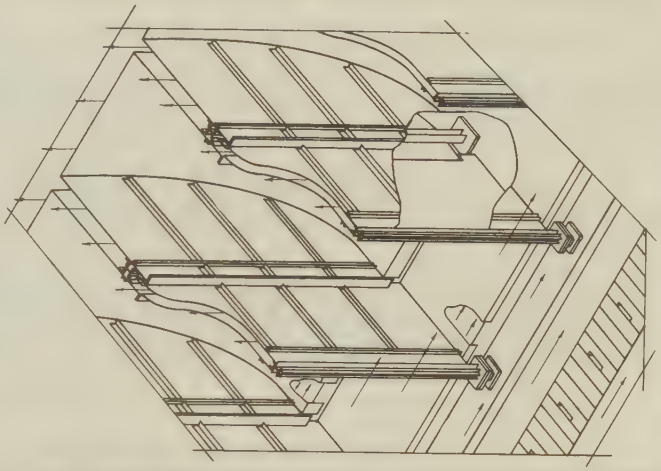

Fig. 2— Isometric view of pen design suggested for future construction

2.1129 (Cross Reference: 2.14)

going through the pump. However, the majority of fish were dead, apparently having been injured by the pumping process or by the force of the water in the receiving tank. Fish that were examined showed injuries in the region of the head. The improvised receiving tank, the force and turbulence of the discharge water, and the absence of deck lights during experimental periods made close observation difficult.

Further tests are planned, using an improved larger receiving tank, to ascertain the ability of these fish to survive the pumping process. If results warrant, additional experiments will be carried out with a larger size pump and several types of fish attractors, such as rheostat-controlled lights of varying intensity and electrical fields.

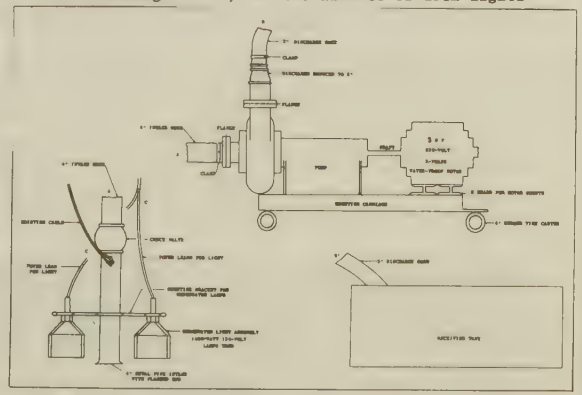

FIGURE 1 - DIAGRAM OF "FISH PUMP" DEVICE. THE INTAKE PIPE AND UNDERWATER LIGHT ASSEMBLY WERE CONNECTED TO THE INTAKE HOSE OF THE PUMP, A TO A', AND THE DISCHARGE HOSE RAN TO A RECEIVING TANK, B TO B'.

3.12 PRESERVATION OF HERRING

Anonymous
Meldinger S.S.F., No. 4, 89-92, 94-95 and No. 5, 108-114 (1951)

I. Processing the summer herring.

A quantity of herring, of which half had been preserved with nitrite and half with formalin, within 4 hours of landing, was received at the S.S.F. herring meal and oil pilot plant at Tjaere Bay 9 days later and was processed on the day of arrival. The herring preserved by both methods were about equally satisfactory. It is concluded that the addition of preservative to the herring facilitates processing.

II. Preservation IV. Technical preservation experiments with formalin and nitrite.

Formalin was unsatisfactory for winter herring, probably because it failed to penetrate the tissues; also, such a large quantity of formalin was required to achieve reasonable preservation that the herring became too hard for processing. With winter herring, spraying with nitrite gave better results than immersing in nitrite brine. Nitrite is the most generally effective of the new preservatives so far tested, and it is satisfactory for both small herring and winter herring; the preserved material is easy to process in normal factory equipment. Formalin appears to be as good as nitrite for small herring. Good results were obtained with formalin + nitrite.

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(The above abstract appears in Food Science Abstracts 25, No. 2, 144-145, March, 1953 and is reprinted here)

2.19 DO WE NEED TO GUT FLOUNDERS AT SEA?

Castell, C. H. and MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, N.S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 14-17 (March, 1953)

The authors attempted to determine the approximate time of storage in ice when ungutted flounders would begin to deteriorate more rapidly than gutted flounders. To gather the necessary information, technicians were placed on various vessels at sea to carefully ice down both gutted and ungutted fish from each day's catch.

Commercially cut fillets were prepared as soon as the vessels reached shore. Ungutted and gutted flounders that had been well iced for four days yielded fillets that were indistinguishable. Ungutted flounders that had been 4 to 7 days in ice yielded fillets showing evidence of a gradual deterioration in quality that was readily apparent in fillets from 7-day-old fish. However, variations in quality between flounders from different vessels was most prevalent in the 4- to 7-day-old ungutted fish, for not all of the fish in this time group deteriorated at the same rate. Surprisingly, fillets from ungutted and gutted flounders that ranged upwards to 7 days in ice did not show any significant difference in pH, bacterial count, or trimethylamine value. Similarly, fillets from the ungutted fish, although becoming soft and discolored, did not develop any unpleasant spoilage odors indicative of bacterial decomposition.

Fillets from ungutted and gutted flounders were also wrapped in wax paper and stored at 32°F. to determine their keeping quality as fillets. Many of the fillets from ungutted fish that had been in ice aboard the vessel for 6 or 7 days were already soft and viscera stained. These fillets spoiled somewhat more rapidly than fillets from similar

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 ABSTRACTER: Martin Heerdt

2.2 SHELL-FISH FOR HUMAN CONSUMPTION. PART II

Dewberry, Elliot B.
Food Manufacture 28, No. 4, 149-151 (April, 1953)

The historical background of the use of shell-fish in Great Britain was described in Part I. Part II presents bacteriological standards and descriptions of purification processes for oysters and cockles.

In an attempt to simplify the purification of oysters, the Yealm Oyster Fisheries of Plymouth, Devon have constructed 3 concrete tanks 3 feet in width by 4 feet in depth and holding 300 gallons of sea water. Each of these tanks is provided with wooden grids about 6 inches from the tank bottom, and wooden covers to exclude debris. Sea water for filling the tanks to within 9 inches of the top is obtained on the incoming tide, 1 1/2 hours before high water, from an inlet pipe that is submerged by the tide.

Oysters to be purified are first scrubbed and hosed down to remove mud and debris; they are then placed on the wooden grids in the tanks and allowed to remain for four days without a change of sea water. Water temperatures remain sufficiently high to make purification of oysters practicable even during the winter months. Examples of pollution counts per ml. of oyster flesh during April and May, when the water temperatures ranged between 9.5° and 13.5°C., were as follows:

Roll tube	Faecal coli per ml. flesh 4/20/51	4/26/51	5/2/51	5/16/51
a	4	6	4	2
b	4	2	0	0
c	2	4	0	4
d	0	4	0	6

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 ABSTRACTER: Martin Heerdt

3.5 BACTERIOLOGY OF LIGHT SALTED FISH: SLIMING

Dussault, H. P. (Gaspe Fisheries Experimental Station, Grande Riviere, P.Q.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 3-5 (March, 1953)

Light salted fish producers established along the Gaspe Coast recently became aware of a type of spoilage called "sliming" that occurs in their product during the waterhorsing stage and during initial drying. Sliming is characterized by the appearance of a layer of semi-greasy, glistening yellowish gray or beige-colored film accompanied by a strong pungent odor on the flesh surface of the fish. The conditions primarily responsible for sliming are a poor initial fish quality, insufficient brining, an excessively long period of waterhorsing, and over-all inferior drying conditions established by high relative humidity, high temperature, and poor circulation of air.

To determine the effect of temperature upon sliming, commercial light salted fish containing 5.45 percent NaCl and 74.2 percent moisture were obtained from a local producer. Small piles of these fish were placed in each of four different rooms for observation of the development of sliming. Since sliming is a surface phenomenon, bacterial plate counts were made on the basis of one square centimeter of surface. Dilutions were made with 7.5 percent brine and cultures were plated on nutrient agar containing 7.5 percent NaCl. A general summary of the results obtained is presented in table 1 (this card, over). The findings indicate that the danger of sliming during waterhorsing can be reduced measurably simply by lowering the temperature and decreasing the time.

To find the optimum salt concentration for the growth of sliming bacteria, dilutions of a sample of light salted fish in the advanced stages of sliming were plated out into

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 ABSTRACTER: Martin Heerdt

PRESERVATIVES FOR HERRING

DECONTAMINATION OF SHELL-FISH

QUALITY OF GUTTED VS. UNGUTTED FLOUNDERS

SLIMING IN LIGHT SALTED FISH

2.2 (Cross References: 1.80, 2.05)

Roll Tube	Faecal coli per ml. of flesh 4/20/51	4/26/51	5/2/51	5/16/51
e	0	0	2	4
f	2	16	30	2
g	2	0	42	0
h	2	4	14	8
i	4	0	18	0
j	2	2	28	2

After two and four days in the tanks of sea water the oysters rid themselves of all faecal B. coli. The success of these experiments has resulted in permission to market oysters that have been purified by the modified procedure provided bacteriological examination of each batch proves satisfactory.

Cockles, on arrival from the gathering areas, are first washed in sea water and then in potable tap water for the removal of mud and sand. After the shells have been cleaned the cockles are cooked under steam pressure for at least 6 minutes in retorts that have been approved by the port health authority. Retorting is followed by riddling on a rectangular riddle suspended over a 30-gallon tank of fresh water. As the riddle is moved back and forth the shells become separated from the meats which fall into the water. After the foregoing preliminary washing the meats are transferred to tanks containing potable tap water and stirred to facilitate further cooling and the removal of sand and shell fragments. When cold, the cockles are removed from the final wash tanks and hand picked for shell fragments prior to salting. Cockles for distant markets are stored temporarily in concrete tanks containing a strong salt brine that must be removed by soaking in fresh water prior to use. Cockles to be sold locally are merely salted to taste or to bring out the flavor and then packed in muslin bags which are placed in wicker hampers for transportation by rail or truck.

3.5 (Cross Reference: 2.01)

nutrient agar containing from 0 to 20 percent NaCl. The maximum number of bacteria were obtained on media containing between six and eight percent NaCl, a salt concentration that is similar to that of the fish during waterhorsing.

A preliminary microscopic examination of a number of individual sliming colonies that had been picked from plates and grown on agar slants showed that 80.5 percent of the strains were Gram negative rods, 11 percent Gram negative cocci, 5.5 percent Gram positive cocci and 2.7 percent Gram variable rods. Further study of the problem is planned.

TABLE I

Changes in Appearance and Bacterial Numbers during Waterhorsing of Light Salted Fish at varying Temperatures

	OBSERVATIONS	0 Days	2 Days	3 Days	4 Days
1.	Temperature	79°F.	72°F.	75°F.	77°F.
	Bact. No/sq. cm.	1.2×10^6	4.0×10^9		2.3×10^9
	Appearance	Good	Sliming	Sliming	Sliming
2.	Temperature	68°F.	64°F.	63°F.	64°F.
	Bact No/sq. cm.	2.3×10^4	1.33×10^8		4.0×10^9
	Appearance	Good	Sliming	Sliming	Sliming
3.	Temperature	60°F.	54°F.	59°F	60°F.
	Bact No/sq cm	1.2×10^4	1.56×10^5		2.88×10^9
	Appearance	Good	Good	Sliming	Sliming
4.	Temperature	50°F.	45°F.	49°F.	60°F.
	Bact. No/sq. cm.	7.0×10^4	3.46×10^8		4.3×10^8
	Appearance	Good	Good	Fair	Sliming

3.12 (Cross Reference: 1.2)

III. Stomach contents and keeping quality of herring

A report by Kj. Balsrud states that winter herring can be stored for several weeks without special precautions being taken, but that summer herring are sometimes landed with burst bellies; such fish rapidly putrefy, and at best summer herring can be stored for only a few days. Bursting occurs early when the gut is full, and is affected by the food within the gut. The best known types of food consumed by herring are (1) "red feed", consisting of small crayfish, especially Calanus finmarchicus, and (2) "black feed", a wing-snail Limacina helicina; the latter takes a long time to digest and blackens the gut. The proteinase activity of herring gut was 80 to 100 times greater than that of "red feed", and this latter was almost 20 times more active than "black feed". The proteinase activity of the food itself therefore appears to be unimportant. The proteinase activity of the gut in summer herring was much greater than in winter, when food was scarce; food in the gut probably causes bursting by stimulating the production of digestive enzymes by the gut.

2.19

gutted fish. With the exception of the soft and stained fillets, very little if any difference was observed in the spoilage rate of fillets from gutted and ungutted flounders. It would appear, therefore, that in many instances it would be advantageous to bring in at least part of the catch ungutted, particularly when this part can be landed within 3 or 4 days. The foregoing observations apply only when the fish are iced down shortly after being caught.

8.50 THE NUTRITIVE VALUE OF MARINE PRODUCTS. VIII. PROXIMATE ANALYSIS OF CANNED BRITISH COLUMBIA SOCKEYE AND PINK SALMON

Carter, Neal. M. (Pacific Fisheries Experimental Station)
Journal of the Biological Board of Canada II, No. 5, 439-455 (September-October, 1936)

Canned salmon is the most valuable fishery product produced in British Columbia. Of the five species canned, sockeye (O. nerka) is of greatest commercial value. The other four species vary from year to year in their relative economic positions.

Table VI. Average composition of canned B.C. sockeye and pink salmon, from direct analysis of composite contents of six cans from each sample

Sample	Water %	Oil %	Solids %	Protein %	Salt-free mineral %	Salt %	Calories per pound
Sockeye:							
Skeena river	66.0	11.00	23.0	20.7	1.45	0.78	852
Rivers inlet	67.8	8.94	23.3	21.0	1.66	0.55	767
Fraser river (off mouth)	70.8	6.69	22.5	20.2	1.58	0.49	658
Fraser river (up stream)	70.0	8.67	21.3	19.0	1.59	1.39	719
Pink:							
Butedale	69.6	7.53	22.9	19.7	1.75	0.89	684
Bones bay	68.8	8.55	22.6	20.5	1.71	1.32	742
Fraser river	76.0	4.17	19.8	17.8	1.25	0.69	507
Av. for sockeye	68.6	8.82	22.5	20.2	1.57	0.80	749
Av. for pink	71.5	6.75	21.4	19.3	1.57	0.97	644

(over)

8.50 THE NUTRITIVE VALUE OF MARINE PRODUCTS. IX. PROXIMATE ANALYSIS OF BRITISH COLUMBIA CANNED PILCHARD

White, F. D. (University of Manitoba)
Journal of the Biological Board of Canada II, No. 5, 457-460 (September-October, 1936)

The composition of canned pilchard prepared from fish caught early and fish caught late in the season was determined by proximate analysis and the results compared. All fish were caught in the same vicinity on the west coast of Vancouver Island. These fish are generally recognized as the mature form of the California sardine. Dill (1926) found the fat content of the Canadian fish to be considerably higher than that of the California sardine.

As determined from analyses of both the total contents and separate components of the contents, the nutritive value in the sample cans of pilchards caught late in the season was much higher than that in the sample cans of fish taken early in the season. This was due mainly to the high fat-content of the late-caught fish.

Table I. Average composition and calculated energy content of samples of canned B.C. pilchard

Sample	Water %	Fat %	Protein %	Sodium chloride-free ash %	Sodium chloride %	Total %	Calories per pound
Early caught	68.22	10.95	16.46	1.88	1.38	98.89	768
Late caught	60.70	18.88	15.85	1.64	1.52	98.59	1090
Average	64.46	14.92	16.16	1.76	1.45	.....	929

(over)

8.50 THE NUTRITIVE VALUE OF MARINE PRODUCTS. XI. PROXIMATE ANALYSIS OF CANNED BRITISH COLUMBIA COHO (BLUEBACK) SALMON

Riddell, W. A. (Pacific Fisheries Experimental Station)
Journal of the Biological Board of Canada II, No. 5, 463-468 (September-October, 1936)

All samples analyzed for this report were obtained from one cannery operating on coho salmon caught from the vicinity of Johnstone Strait. A twelve-pound sample in 1-pound and 1/2-pound cans was taken at random from the commercial pack at about the twentieth of each month from May to September.

Four 1-pound and twelve 1/2-pound cans were taken at random from the total samples and submitted to individual examination and analysis of the various components; six 1-pound cans were taken from each monthly sample and a composite of their contents was sampled for proximate chemical analysis.

The nutritive value of these samples of coho salmon appears to be greatest in the July-caught fish. Comparison of data indicates that, for the size and distribution of the samples analyzed, the Johnstone Strait coho (blueback) salmon contained more water, less oil, and about the same amount of protein as coho caught in either northern (Alaska) or southern (Washington) waters.

(over)

8.50 NUTRITIVE VALUE OF MARINE PRODUCTS. X. PROXIMATE ANALYSIS OF LING COD

White, F. D. (University of Manitoba)
Journal of the Biological Board of Canada II, No. 5, 461-462 (September-October, 1936)

Three male ling cod weighing 4.18, 1.5, and 3.5 kg. respectively, were analyzed for moisture, fat, protein, and ash and the results tabulated.

After the fish were weighed, the head, viscera and bones were removed and discarded. The skin was separated from the flesh, weighed, minced and held for analysis. The flesh was treated similarly.

The analyses demonstrate that the nutritive value of the flesh of ling cod is due to its protein rather than its fat content, which is negligible.

(over)

8.50 (Cross Reference: 1.33)

Table I. Average composition of specially packed canned Alaska and Washington coho salmon

Locality	No. fish analyzed	Bone %	Bone-free fish: Moisture %	Fat %	NaCl-free ash %	Protein %	Calories per pound
Alaska:							
Western Alaska	27	1.67	66.57	10.31	1.22	20.83	822
Central Alaska	36	1.95	68.94	6.74	1.25	21.61	686
SE. Alaska	18	2.06	68.01	7.80	1.28	21.50	728
Washington:							
Puget Sound	9	2.19	65.43	8.95	1.20	20.46	758
Columbia river	9	2.39	65.41	11.33	1.22	19.35	838
Average	99	1.88	67.49	8.49	1.24	21.08	750

Table IV. Average composition and energy content of entire contents of monthly samples of canned B.C. coho (blueback) salmon

Date	Water %	Fat %	Solids %	Protein %	NaCl-free ash %	NaCl %	Total %	Calories per pound
May 1932	74.65	2.83	22.52	19.50	1.24	1.41	99.63	482
June 1932	74.17	3.35	22.48	19.04	1.03	1.70	99.29	496
June 1933	74.48	4.07	21.45	19.00	1.30	1.12	99.71	525
July 1933	69.75	6.83	23.42	21.01	1.67	0.48	99.91	679
Aug. 1933	71.53	5.25	23.22	20.55	1.08	1.67	100.08	604
Sept. 1933	72.04	4.65	23.31	20.79	1.91	0.41	99.80	584
Average	72.77	4.50	22.72	19.89	1.37	1.13	.....	562

8.50 (Cross Reference: 1.30)

This paper reports the proximate analysis for water, ether extract, protein and mineral in the separate constituents (free aqueous liquor, flesh, skin, bone) as well as total contents, in samples of canned sockeye and pink salmon (O. gorbuscha) from various localities off the coast of British Columbia. Energy value was computed from the amounts of ether extract and protein.

Extensive analyses of canned salmon from the coasts of Alaska and the northwestern United States have shown that considerable variation exists in the energy value and fat content of salmon caught in these two areas. The data now available from several widely separated points in British Columbia waters allow a comparison of the composition of canned salmon from a wide area.

Table I. Average composition of Alaska and Washington canned sockeye and pink salmon

Sample	Bone %	Bone-free fish: Moisture %	Fat %	Protein %	NaCl-free ash %	Calories per pound
Sockeye						
Special pack:						
West. Alaska	1.99	68.88	6.90	20.90	1.36	680
Cent. Alaska	2.12	68.78	6.65	21.49	1.30	680
SE Alaska	1.67	66.62	8.92	21.56	1.33	777
Puget Sound	2.32	63.44	10.29	20.53	1.23	815
Columbia R.	2.19	61.28	15.45	20.26	1.31	1028
Commercial pack (var. localities)	2.37	64.78	11.22	20.80	1.23	860
Pink						
Special pack:						
West. Alaska	2.31	69.81	7.31	20.09	1.25	681
Cent. Alaska	2.33	71.07	5.12	20.90	1.34	605
SE Alaska	2.34	69.61	6.58	20.57	1.33	660
Puget Sound	2.20	68.23	6.11	20.57	1.33	640
Commercial pack (var. localities)	2.53	69.80	6.99	21.40	0.76	696

8.50 (Cross Reference: 1.5)

Table I. Proximate analyses (mean values) and calculated energy values of the flesh and skin of ling cod

Sample	Proportion of whole fish %	Moisture %	Fat %	Protein %	Ash %	Total %	Calories per 100 g.
Flesh: (a)	49.0	78.5	0.8	18.6	1.2	99.3	...
(b)	49.7	78.9	0.6	18.6	1.4	99.5	...
(c)	51.7	80.2	0.6	17.1	1.1	99.0	...
Average.....	50.1	79.2	0.7	18.1	1.2	99.2	81
Skin: (a)	7.2	71.9	0.7	25.2	1.9	99.7	...
(b)	6.9	67.9	0.2	28.4	3.1	99.6	...
(c)	5.2	68.9	1.1	27.2	2.6	99.8	...
Average.....	6.4	69.6	0.7	26.9	2.5	99.7	117
		Moisture-free basis					
Flesh (average)	...	....	3.4	87.0	5.8	96.2	388
Skin (average)	...	....	2.3	88.5	8.2	99.0	384

8.50 (Cross References: 1.2, 3.39)

Table II. Average composition and calculated energy content of separate components in samples of canned B.C. pilchard

Component	Water %	Fat %	Protein %	Sodium chloride-free ash %	Total %	Calories per pound
Early caught:						
Flesh*	68.2	9.7	17.1	1.5	96.5	...
Skin	66.1	14.9	13.1	3.6	97.7	...
Bone	56.8	5.2	8.7	20.6	91.3	...
Total can content	68.0	9.8	16.9	1.9	96.6	726
Late caught:						
Flesh*	59.5	17.7	16.7	1.1	95.0	...
Skin	62.4	22.7	9.4	2.4	94.9	...
Bone	52.6	8.5	9.4	22.1	92.6	...
Total can content	60.0	18.1	15.7	1.5	95.3	1057

* Including free oil and aqueous liquor

0.12 FRESH WATER FROM SEA WATER BY SOLAR DISTILLATION

Telkes, Maria (MIT, Cambridge)
Industrial & Engineering Chemistry 45, No. 5, 1108 (May, 1953)

0.33 STUDIES OF THE REACTION BETWEEN PROTEINS AND REDUCING SUGARS IN THE "DRY" STATE. IV. DECOMPOSITION OF THE AMINO-SUGAR COMPLEX AND THE REACTION OF ACETYLATED CASEIN WITH GLUCOSE

Lea, C. H.; Hannan, R. S. and Rhodes, D. N.
Biochim. Biophys. Acta 7, 366-377 (1951)
Food Science Abstracts 25, No. 2, 167 (March, 1953)

0.5 EFFECT OF PROLONGED STORAGE ON THE FATE OF RED HALOPHILIC BACTERIA IN CONTAMINATED SALT

Dussault, H. P.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 7-9 (March, 1953)

(Abstract of this article appears under 3.5 page 13)

0.7 EFFECT OF METHIONINE SUPPLEMENTATION AND DIFFERENT PROTEIN LEVELS ON GROWTH AND FEED REQUIREMENTS OF BROILER CHICKENS

Combs, G. F.; Twining, P. F.; and Laurent, C. K.
Southern Fisherman 13, No. 2, 73-75 (February, 1953)

(Abstract of this article appears under 6.195 page 15 - June, 1953 issue)

1.95 WHITE WHALES OF MANITOBA

Rutherford, O. B. and Morphy, J H.
Trade News 5, No. 6, 3 (December, 1952)

1.95 MODERN WHALING AND ITS PROSPECTS

Rudd, Johan T. (University of Oslo)
FAO Fisheries Bulletin 5, No. 5, 165 (September-October, 1952)

1.95 WHALE MEAT -- A POTENTIAL FOOD RESOURCE

Kondrup, Mogens
FAO Fisheries Bulletin 5, No. 5, 184 (September-October, 1952)

1.95 THE WHALING INDUSTRY

Hindle, E.
J. Roy. Soc. Arts 100, 132-146 (1952)
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1.2 PRESERVATION

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(Abstract of this article appears under 3.12 page 13 - June, 1953 issue)

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Food Science Abstracts 25, No. 1, 18 (January, 1953)

(Abstract of this article appears under 3.12 page 3 - June, 1953 issue)

1.2 FATTY ACID COMPOSITION OF FISH OILS. II. HERRING OIL

Swain, Lyle A.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 24-26 (March, 1953)

(Abstract of this article appears under 4.11 page 5)

1.2 PRESERVATION OF HERRING

Anonymous
Meldinger S.S.F., No. 4, 89-92, 94-96 and No. 5, 108-114 (1951)
Food Science Abstracts 25, No. 2, 144-145 (March, 1953)

(Abstract of this article appears under 3.12 page 17)

1.2 NEW SWEDISH HERRING FILLETING MACHINE

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report No. 84, Seattle, Washington (April 30, 1953)

(Abstract of this article appears under 2.3 page 1)

1.2 THE NUTRITIVE VALUE OF MARINE PRODUCTS. IX. PROXIMATE ANALYSIS OF BRITISH COLUMBIA CANNED PILCHARD

White, F. D.
Journal of the Biological Board of Canada II, No. 5, 457-460 (September-October, 1936)

(Abstract of this article appears under 8.50 page 19)

1.30 JAPANESE 1952 NORTH PACIFIC SALMON-FISHING EXPEDITION

Fukuhara, Francis M.
Commercial Fisheries Review 15, No. 2, 1 (February, 1953)

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Carter, Neal M.
Journal of the Biological Board of Canada II, No. 5, 439-455 (September-October, 1936)

(Abstract of this article appears under 8.50 page 19)

1.30 AMINO-ACID CONTENT OF SALMON ROE -- TECHNICAL NOTE #25

Seagran, Harry L.
Commercial Fisheries Review 15, No. 3, 31-34 (March, 1953)

(Abstract of this article appears under 8.51 page 9)

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Riddell, W. A.
Journal of the Biological Board of Canada II, No. 5, 463-468 (September-October, 1936)

(Abstract of this article appears under 8.50 page 19)

1.80 SHELL-FISH FOR HUMAN CONSUMPTION. PART II

Dewberry, Elliot B.
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(Abstract of this article appears under 2.2 page 17)

1.82 COMMON MARINE BIVALVES OF CALIFORNIA

Fitch, John E.
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1.85 ALASKA'S SHRIMP INDUSTRY

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Commercial Fisheries Review 15, No. 3, 19-24 (March, 1953)

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1.86 THE STEPHENSON COLLAPSIBLE CRAB TRAP

Butler, T. H.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 94, 16-18 (March, 1953)

(Abstract of this article appears under 2.1128 page 1)

2.01 THE ACTION OF MEMBERS OF THE GENUS ACHROMOBACTER ON TRIMETHYLAMINE OXIDE AND RELATED COMPOUNDS

Campbell, L. L. Jr. and Williams, O. B.
J. Bact. 62, 249-251 (1951)
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2.01 CONTAMINATED ICE IN THE BOATS AT SEA

Castell, C. H. and Triggs, R. E.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 24-26 (March, 1953)

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2.01 BACTERIOLOGY OF LIGHT SALTED FISH: SLIMING

Dussault, H. P.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 55, 3-5 (March, 1953)

(Abstract of this article appears under 3.5 page 17)

2.01 THE EFFECT OF FASTING ON THE BACTERIAL FLORA OF THE INTESTINE OF FISH

Margolis, Leo
Journal of the Fisheries Research Board of Canada 10, No. 2, 62-63 (April, 1953)
(Abstract of this article appears under 0.5 page 9)

2.14 FRESH WATER FISH, HYPOMESUS OLIDUS AND ZACCO PLATYPUS ARE ATTRACTED BY ARTIFICIAL LIGHT

Kawada, Saburo and Yoshimuta, Chosei
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 227 (1952)
(In Japanese with English summary, tables and figures)

2.14 SOME PRACTICAL ASPECTS OF ELECTRIC FISHING

Harris, Virgil E.
Atlantic Fisherman 34; No. 1, 13 (February, 1953)

2.14 DISTRIBUTION OF CATCHES OF TUNA LONG LINE -- III. SWIMMING DEPTH

Yoshihara, Tomokichi
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 187 (1952)
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2.14 EXPERIMENTS WITH A "FISH PUMP"

Ellson, J. G.
Commercial Fisheries Review 15, No. 2, 27 (February, 1953)

(Abstract of this article appears under 2.1129 page 15)

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Journal of Nutrition
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Journal of the American Dietetic Association
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Oil, Paint and Drug Reporter
Pacific Fisherman
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Poultry Science
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Progressive Fish-Culturist
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Western Canner and Packer
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Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

3.26 NOVEL THERMO TRAIN DEVELOPED IN SWEDEN FREEZES PERISHABLES ON THE SPOT ANYWHERE

Anonymous
Refrigerating Engineering 61, No. 3, 295 (March, 1953)

(Abstract of this article appears under 3.231 page 3 - May, 1953 issue)

3.26 REFRIGERATED TRUCK TRANSPORT PROBLEMS

Redit, W. H. (USDA)
Refrigerating Engineering 61, No. 5, 514 (May, 1953)

3.26 NEW INSULATOR MAKES FOOD SHIPMENTS BY MAIL POSSIBLE

Anonymous
Frosted Food Field 16, No. 2, 14 (February, 1953)

The use of a new loose-fill glass fiber insulating material has made possible the shipment of frozen foods via parcel post. In tests conducted under conditions of high humidity and temperatures ranging from 95° to 100°, frozen ducks packaged in three inches of the insulating material remained in good condition for 84 hours.

3.30 HOW TO PREVENT DAMAGE TO CANNED FOODS IN TRANSIT

Kraska, E. J.
Canner 116, No. 13, 12 (March 28, 1953)

3.30 THE DUTCH FISH-CANNING INDUSTRY

Anonymous
Western Fisheries 45, No. 3, 20 (December, 1952)

(Abstract of this article appears under 1.0147 page 1 - May, 1953 issue)

3.39 THE EFFECT OF THE COMMERCIAL CANNING PROCESS UPON PUFFER POISON

Halstead, Bruce W. and Bunker, Norman C.
California Fish and Game 39, No. 2, 219-228 (April, 1953)

(Abstract of this article appears under 2.9 page 1)

3.39 THE NUTRITIVE VALUE OF MARINE PRODUCTS. IX. PROXIMATE ANALYSIS OF BRITISH COLUMBIA CANNED PILCHARD

White, F. D.
Journal of the Biological Board of Canada II, No. 5, 457-460 (September-October, 1936)

(Abstract of this article appears under 8.50 page 19)

3.5 FISH HANDLING AND PROCESSING IN EUROPE -- SALTING AND DRYING COD AND ALLIED SPECIES

Empey, W. A.
Fisheries Newsletter (Australia) 12, No. 2, 8, 10 (February, 1953)

(Abstract of this article appears under 3.7 page 17 - May, 1953 issue)

3.5 BACTERIOLOGICAL INVESTIGATION OF A CASE OF RED DISCOLORATION IN DUTCH SALTED SUMMER HERRING

Luijpen, A. F. M. G.; Mossel, D. A. A.; and Van Den Broek, C. J. H.
Centraal Instituut voor Voedingsonderzoek T.N.O., Utrecht, Publicatie No.152
Antonie Van Leeuwenhoek 19, 78 (1953)

(Abstract of this article appears under 2.01 page 7)

3.5 EXPERIMENTAL SALTING OF HERRING

Trzesinski, P.
Prace Morsk. Inst. Ryback., No. 6, 135-144 (1951)
Food Science Abstracts 25, No. 2, 154 (March, 1953)

8.42 CONSIDERATIONS ON THE SAFETY OF ARSANILIC ACID FOR USE IN POULTRY FEEDS

Frost, Douglas V.
Poultry Science 32, No. 2, 217-227 (March, 1952)

(Abstract of this article appears under 0.7 page 17 - June, 1953 issue)

8.42 IODINE CONTENT OF SOME MARINE ALGAE

Grimm, Madelon R.
Pacific Sci. 6, 318-23 (1952)
Chemical Abstracts 47, No. 1, 220 (1953)

8.59 THE INSULIN CONTENT OF WHALE PANCREAS

Jorpes, J. E.
Hvalradets Skr., Norske Vidensk.-Akad. Oslo, Nr. 35, (1950)
Food Science Abstracts 25, No. 1, 7 (January, 1953)

Whale pancreases contained per kg. of fresh pancreas: 3,000 i.u. for sperm whale, 2,200 i.u. for blue whale, 1,500 i.u. for finback whale, and 1,100 i.u. for humpback whale. The commercial production of insulin from whale pancreas would be expensive, because of the low content of insulin in the pancreas of most species of whale, and the complications caused by the high content of fat.

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Bactericidal ice	15	3.17
Frozen fish, processing		
Brine freezing of fish	5	3.234
Gear, fishing		
Collapsible crab trap	1	2.1128
"Fish pump" experiments	15	2.1129
Handling fresh fish		
Spoilage of fish aboard vessels	7	2.19
Contaminated ice on fishing vessels	11	2.19
Quality control at retail level	15	2.6
Bactericidal ice	15	3.17
Quality of gutted vs. ungutted flounders	17	2.19
Decontamination of shell-fish	17	2.2
Herring and similar species		
Herring filleting machine	1	2.3
Fatty acid composition of herring oil	5	4.11
Preservatives for herring	17	3.12
Experimental salting of herring	25	3.5
Marketing		
Quality control at retail level	15	2.6
North America, Alaskan fisheries and U. S. Territories		
Alaska's shrimp industry	9	1.0112
North America, Canadian fisheries		
Canadian lake trout fishery	13	1.37
Nutritional value of fish and toxicity		
Effect of heat processing on puffer poison	1	2.9
Decontamination of shell-fish	17	2.2
Oils, chemical and physical properties		
Lipoxidase-catalyzed oxidation	11	4.21
Oils, nutrition		
Effect of dietary fat on carcass fat	5	4.91
Preservatives and sanitation		
Preservatives for herring	17	3.12
Salmon		
Amino-acid content of salmon roe	9	8.51
Canadian lake trout fishery	13	1.37
Composition of canned salmon	19	8.50
Japanese salmon expedition to North Pacific	23	1.30
Salt fish		
Effect of dry storage on red halophiles	13	3.5
Experimental salting of herring	25	3.5
Sardines		
Composition of canned sardines	19	8.50
Sharks		
Analysis of ratfish	5	8.51
Shellfish and crustaceans, miscellaneous		
Decontamination of shell-fish	17	2.2
Marine bivalves of California	23	1.82
Shrimp		
New species in B. C. shrimp fishery	1	1.85
Alaska's shrimp industry	9	1.0112
Smoked fish		
Sliming in light-salted fish	17	3.5
Spoilage		
Effect of fasting on intestinal flora of fish	9	0.5
Contaminated ice on fishing vessels	11	2.19
Effect of dry storage on red halophiles	13	3.5
Sliming in light-salted fish	17	3.5
Achromobacter in bacterial spoilage	23	2.01
Transportation		
Refrigerated truck transportation	25	3.26
Shipping container for frozen foods	25	3.26
Prevention of in-transit damage	25	3.30
Vessels, fishing		
Pen construction for refrigerated holds	15	2.114
Whales and other marine mammals		
White whales of Manitoba	21	1.95
Modern whaling	21	1.95
Modern whaling industry	21	1.95
Whale meat as a food resource	21	1.95

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